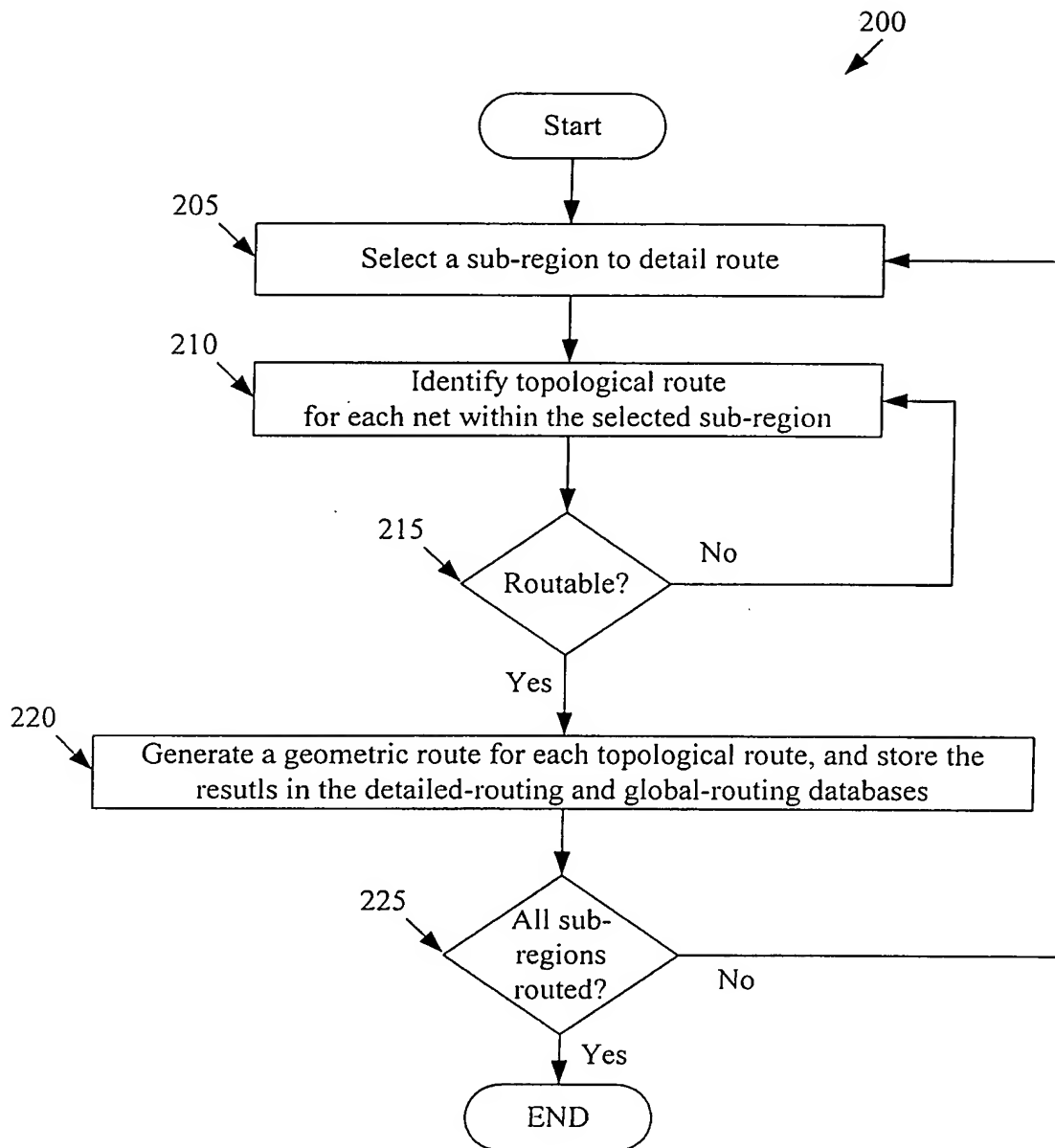


Figure 1



*Figure 2*

202250 409900T

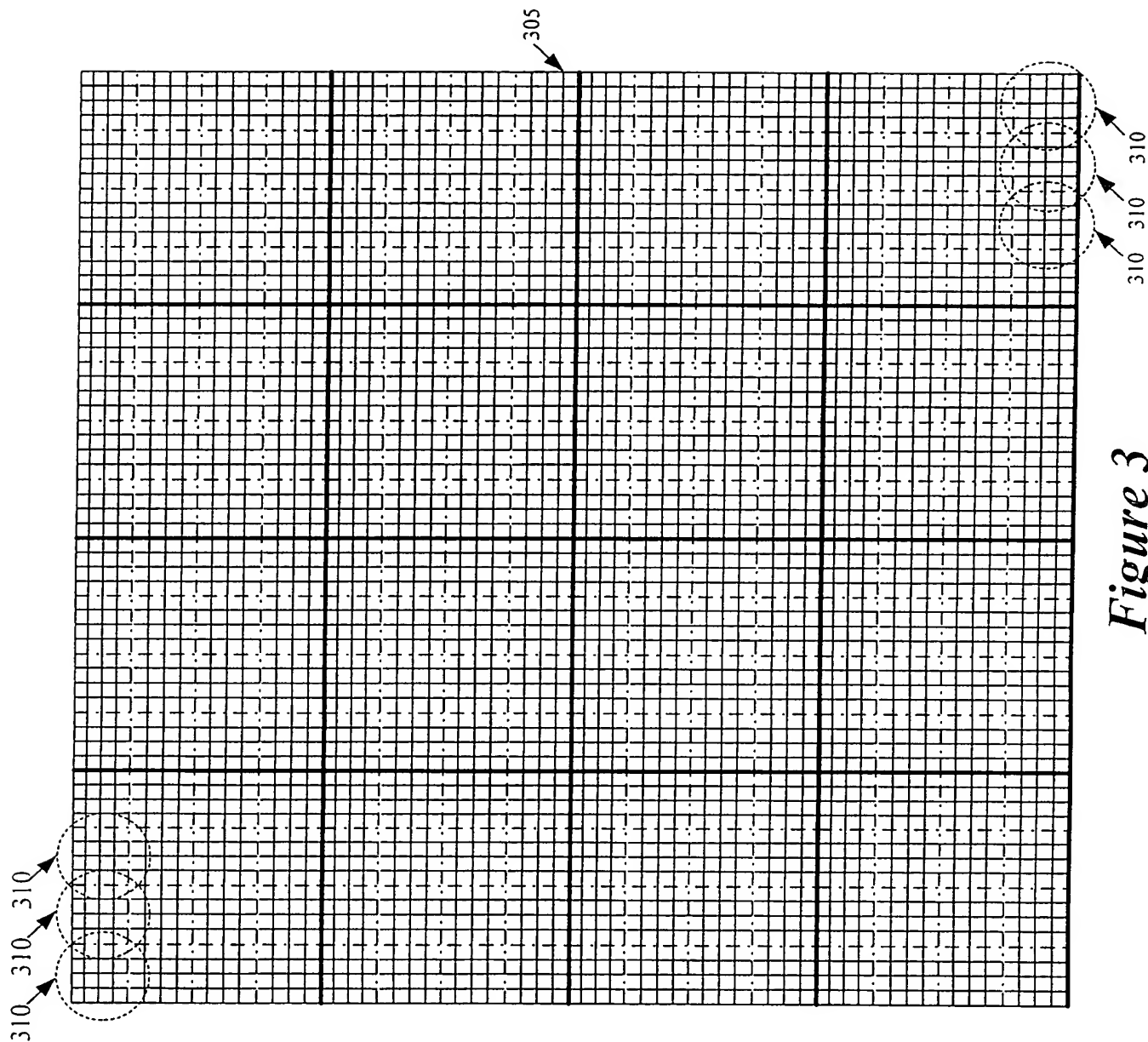


Figure 3

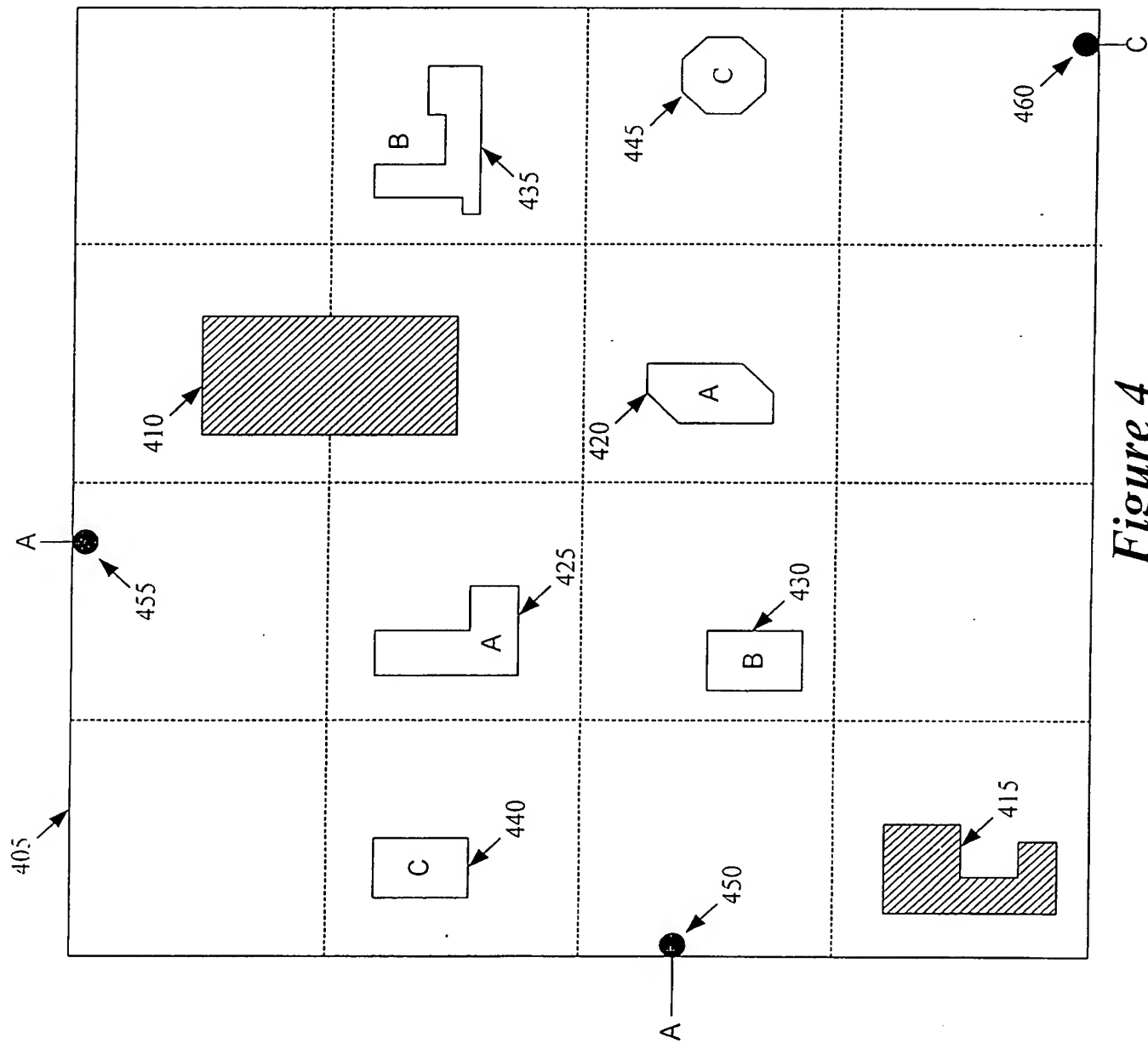


Figure 4

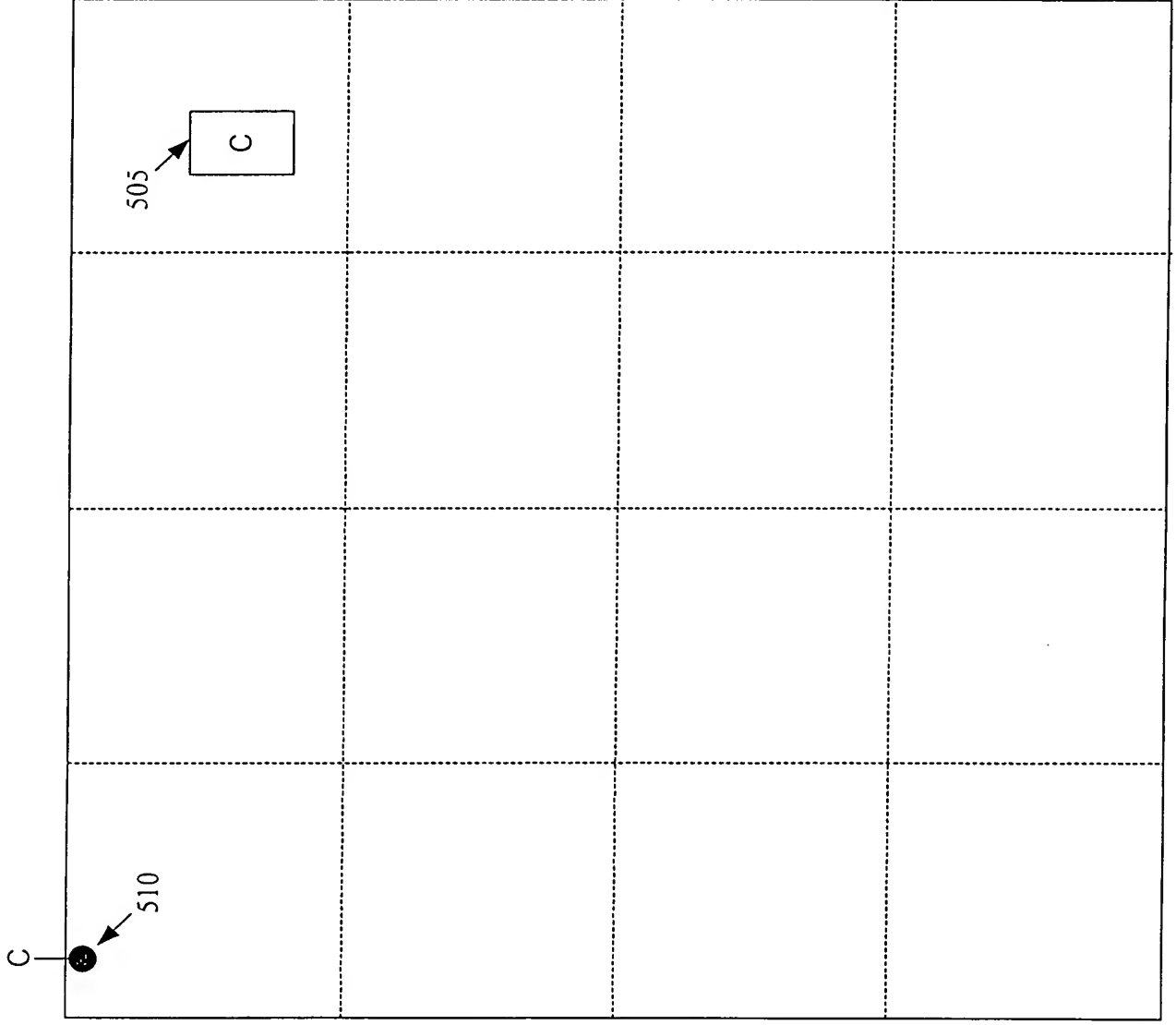


Figure 5

*Figure 6*

```

-List of Geometries
  --Each Geometry including a sequence of points & layer assignment
-Bounding box of the region
-Array of layer properties
  --Minimum wire size
  --Minimum spacing
  --Via sizes
  --Cost/Unit
-Netlist specifying a number of nets
  --Each net specifying a set of pins
    --Each pin specifying a set of ports
    --Each port specifying a set of geometries

```

*Figure 7*

```

-List of Geometries
  --Each Geometry including a sequence of points & layer assignment
    --List of connection nodes inside each pin geometry
-Bounding box of the region
-Array of layer properties
  --Minimum wire size
  --Minimum spacing
  --Via sizes
  --Cost/Unit
-Netlist specifying a number of nets
  --Each net specifying a set of pins
    --Each pin specifying a set of ports
      --Each port specifying a set of geometries
-For each layer, a graph specifying
  --Nodes
  --Edges
  --Faces

```

Face
<ul style="list-style-type: none"><li>-Reference to 3 edges</li><li>-Reference to 3 nodes</li><li>-Up to two references for up to two face item</li></ul>

800

Edge
<ul style="list-style-type: none"><li>-Two references for up to two faces of the edge</li><li>-Capacity</li><li>-Flow</li><li>-Constrained</li><li>-Linked list of items on the edge starting with one of the edge's nodes and ending with its other node</li></ul>

900

Figure 8

Figure 9

Node
<div>1000</div> <ul style="list-style-type: none"><li>-Net Identifier</li><li>-One or more planar-path references to adjacent topological items in the same planar path</li><li>-A pair of via-path references to up and down topological via items</li><li>-A references to list of edges connected to the node</li><li>-For each edge, an edge reference to the next or previous topological item on the edge</li><li>-A reference to the geometry of the node</li><li>-Vertex number identifying the vertex of the geometry</li><li>-Location of the node</li></ul>

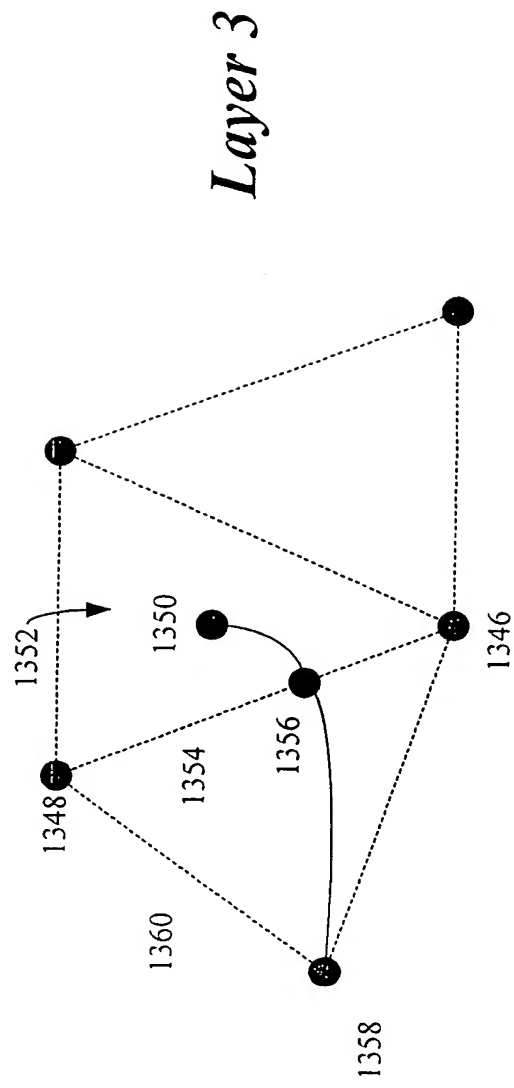
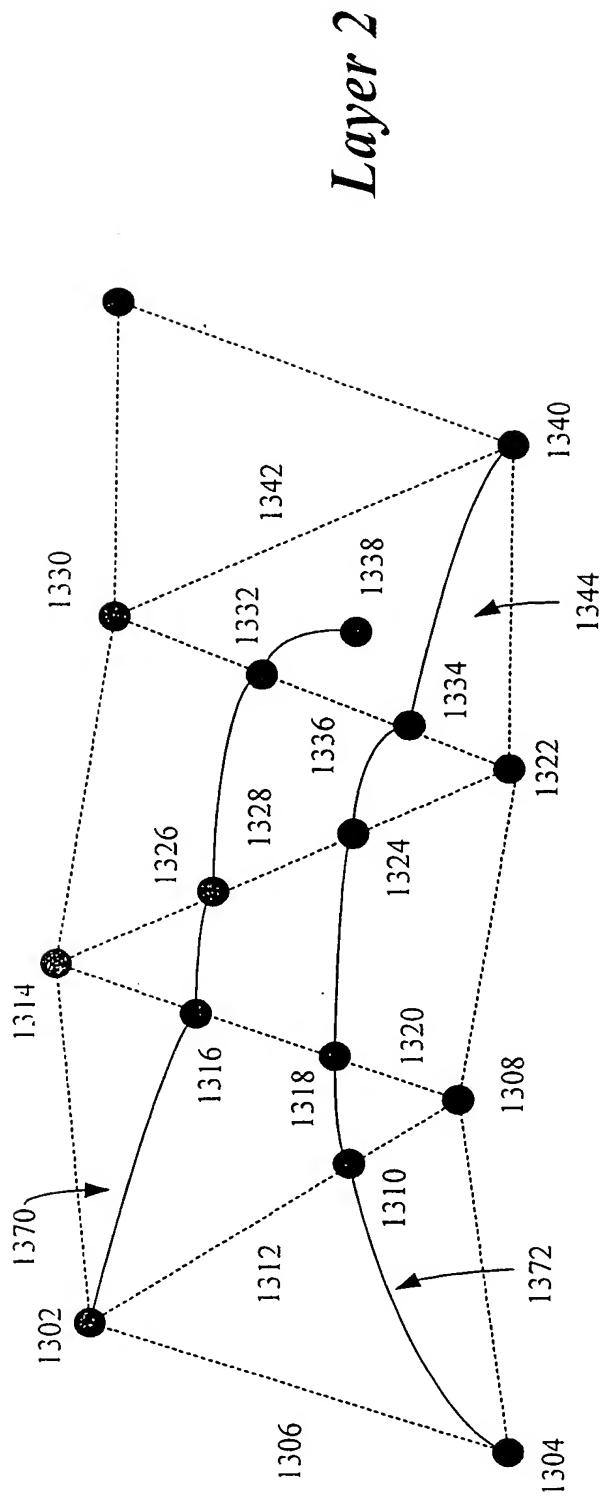
Figure 10

Edge Item	Face Item
<div>1100</div> <ul style="list-style-type: none"><li>-Reference to its edge</li><li>-Net Identifier</li><li>-A pair of planar-path references to adjacent topological items in the same planar path</li><li>-A pair of edge references to the next and previous topological item on the edge</li></ul>	<div>1200</div> <ul style="list-style-type: none"><li>-Reference to its face</li><li>-Net Identifier</li><li>-Up to 3 planar-path references for adjacent topological items in the same planar path</li><li>-A pair of via-path references for up and down topological via items</li><li>-Bounding polygon that defines legal face item locations</li><li>-Constraining Points and Distances</li></ul>

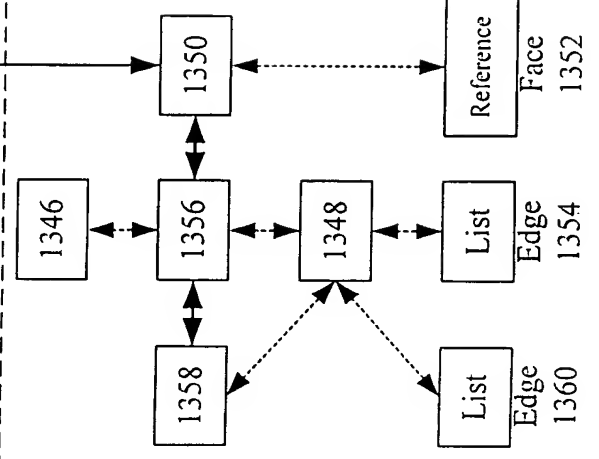
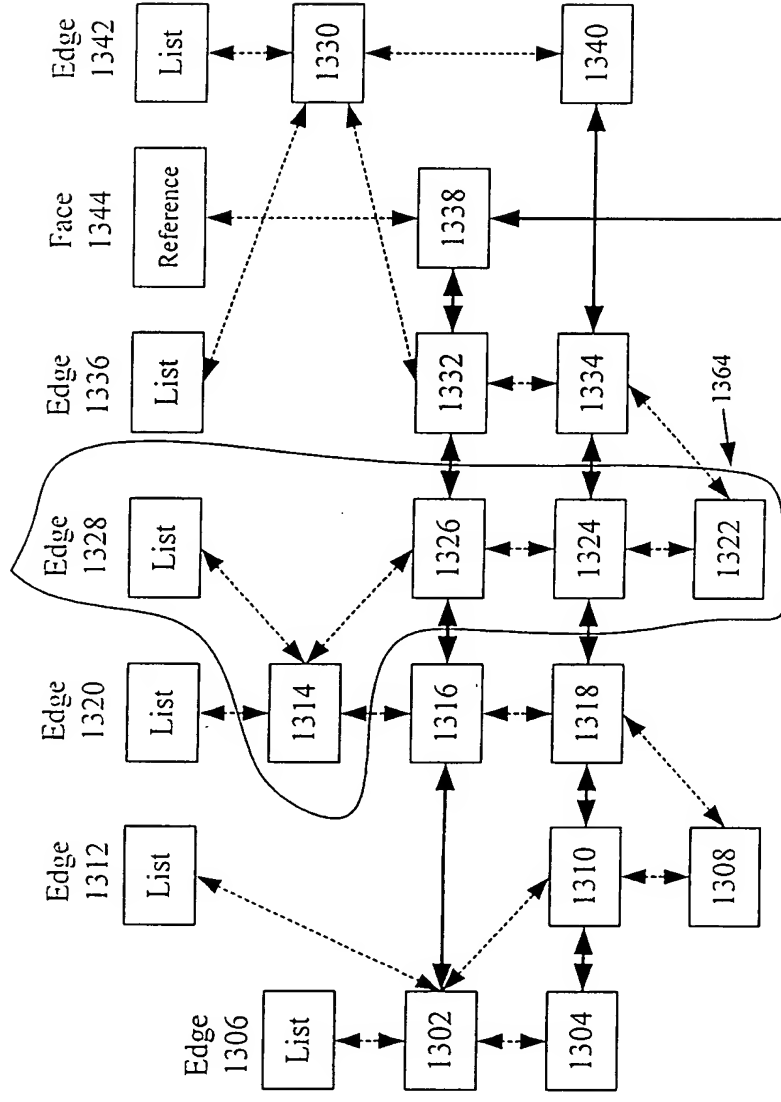
Figure 11

Figure 12

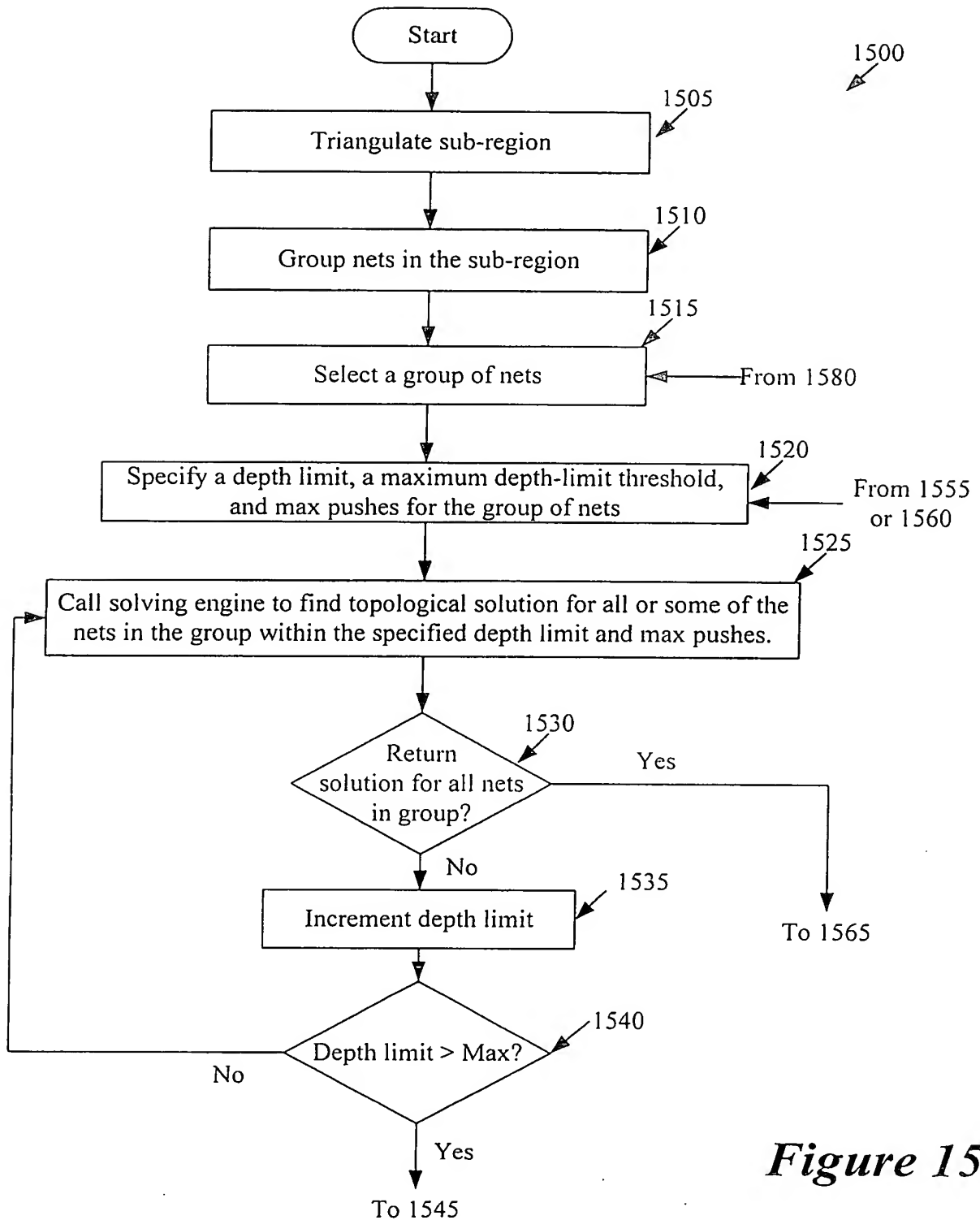




*Figure 13*

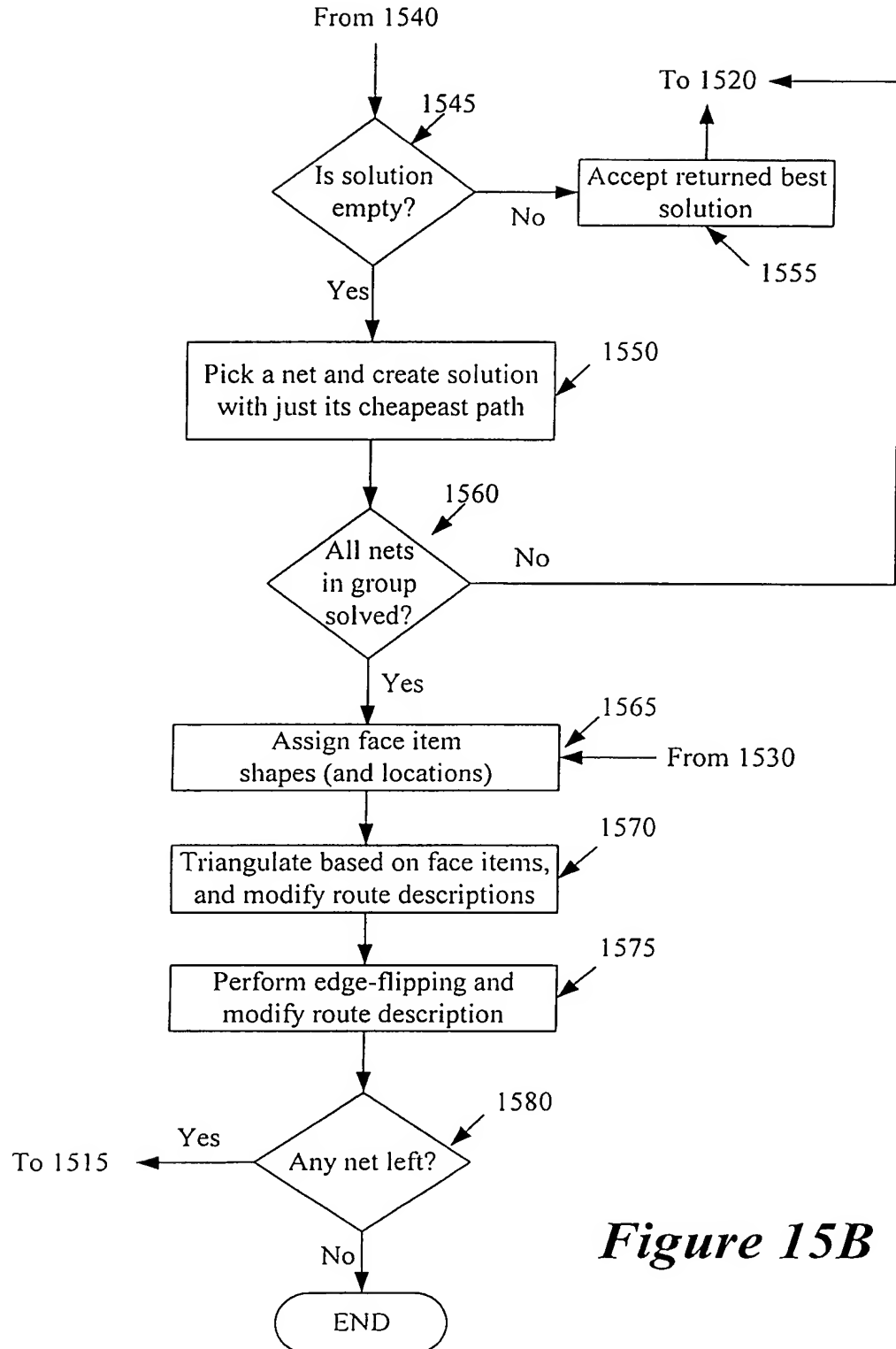


*Figure 14*

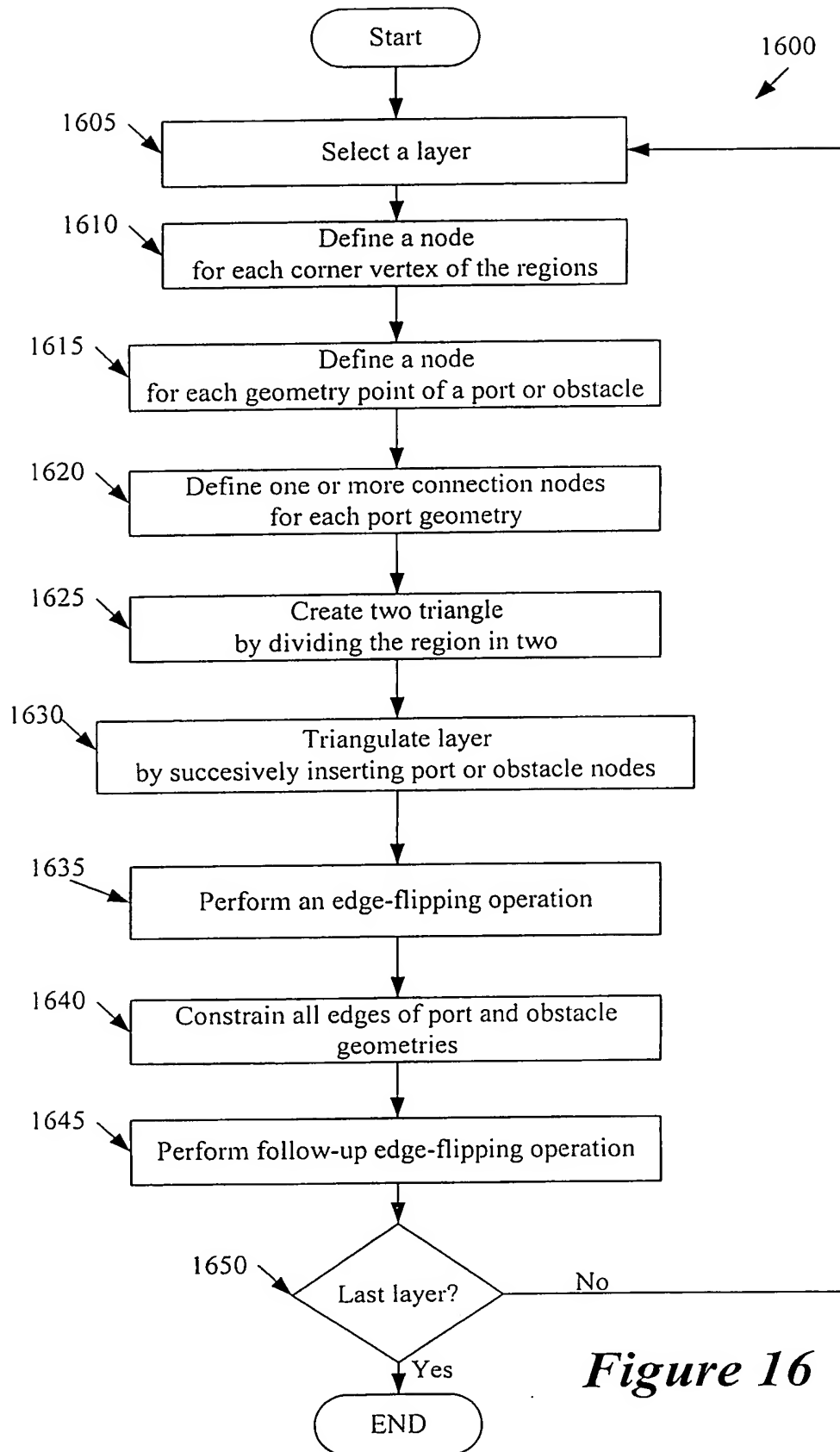


*Figure 15A*

*Figure 15:* *Figure 15A*  
*Figure 15B*



**Figure 15B**

*Figure 16*

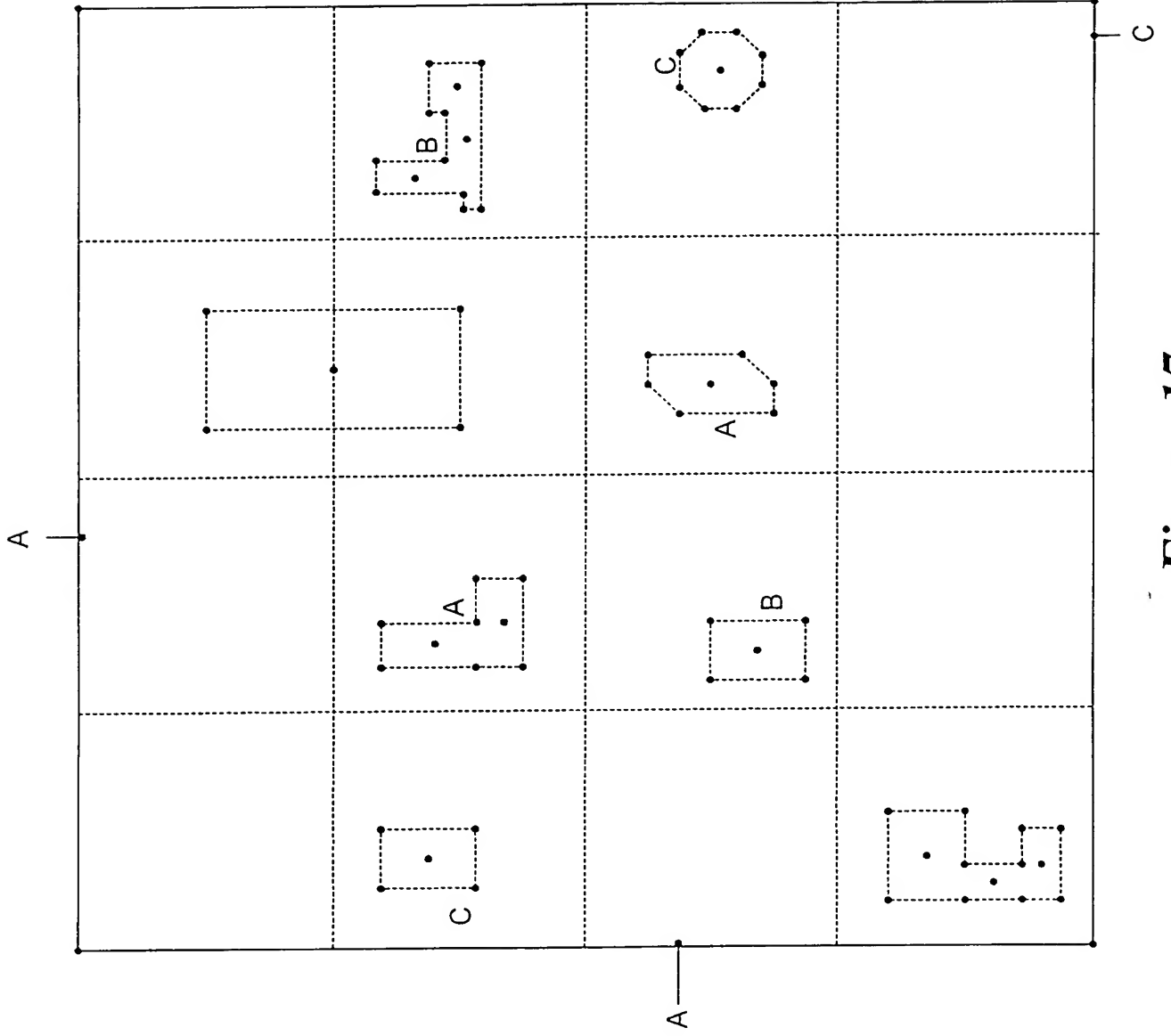


Figure 17

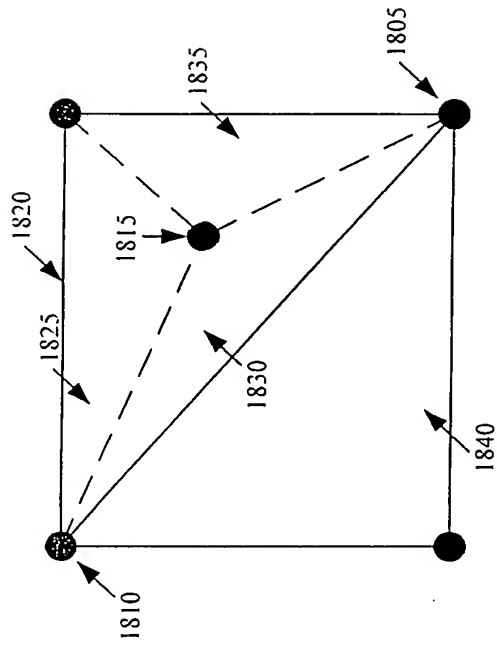


Figure 18

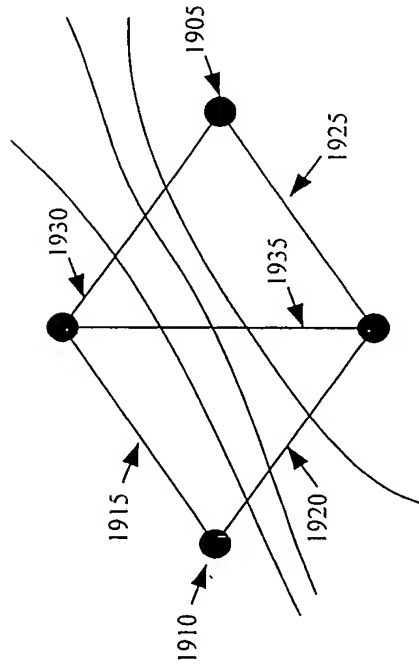


Figure 19

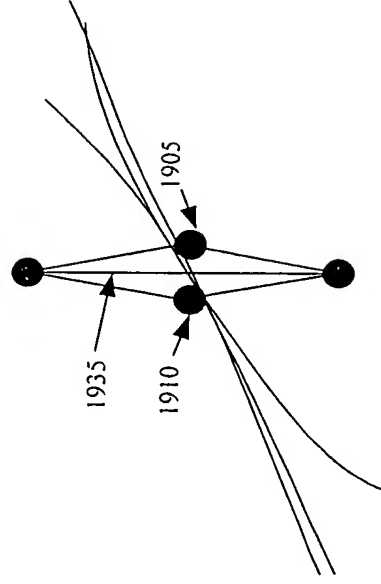


Figure 20

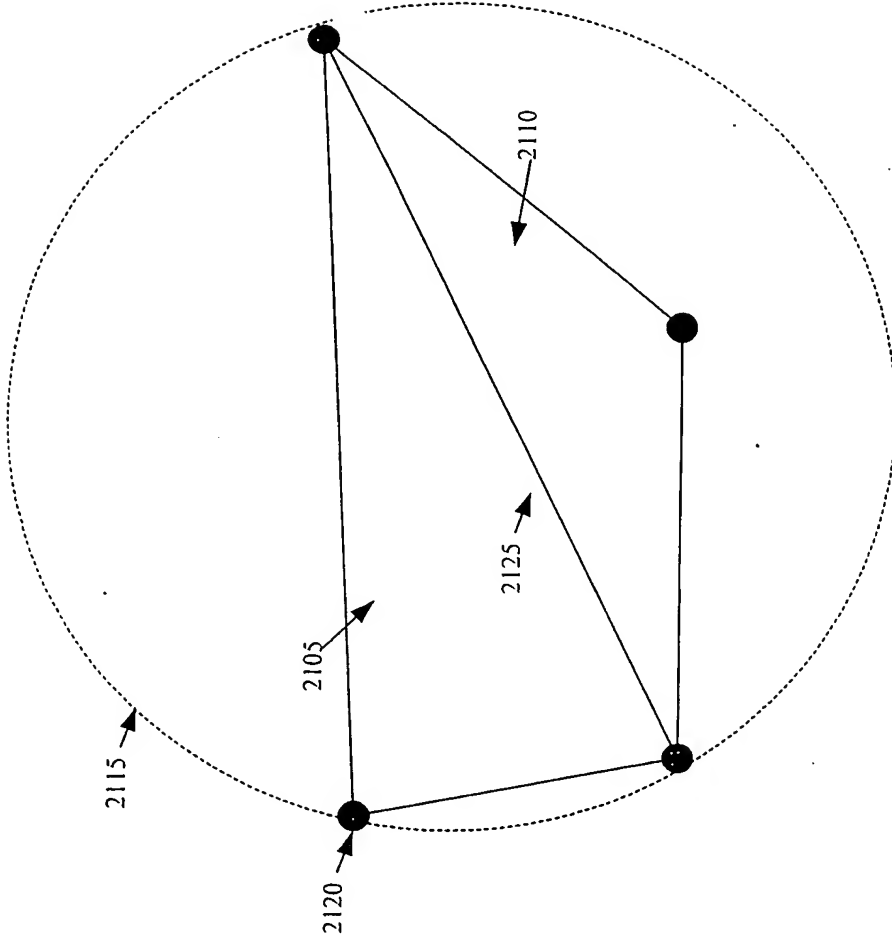


Figure 21

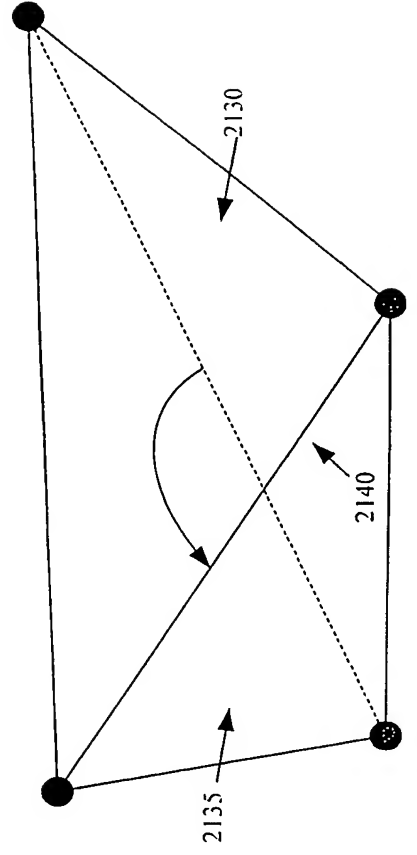


Figure 22



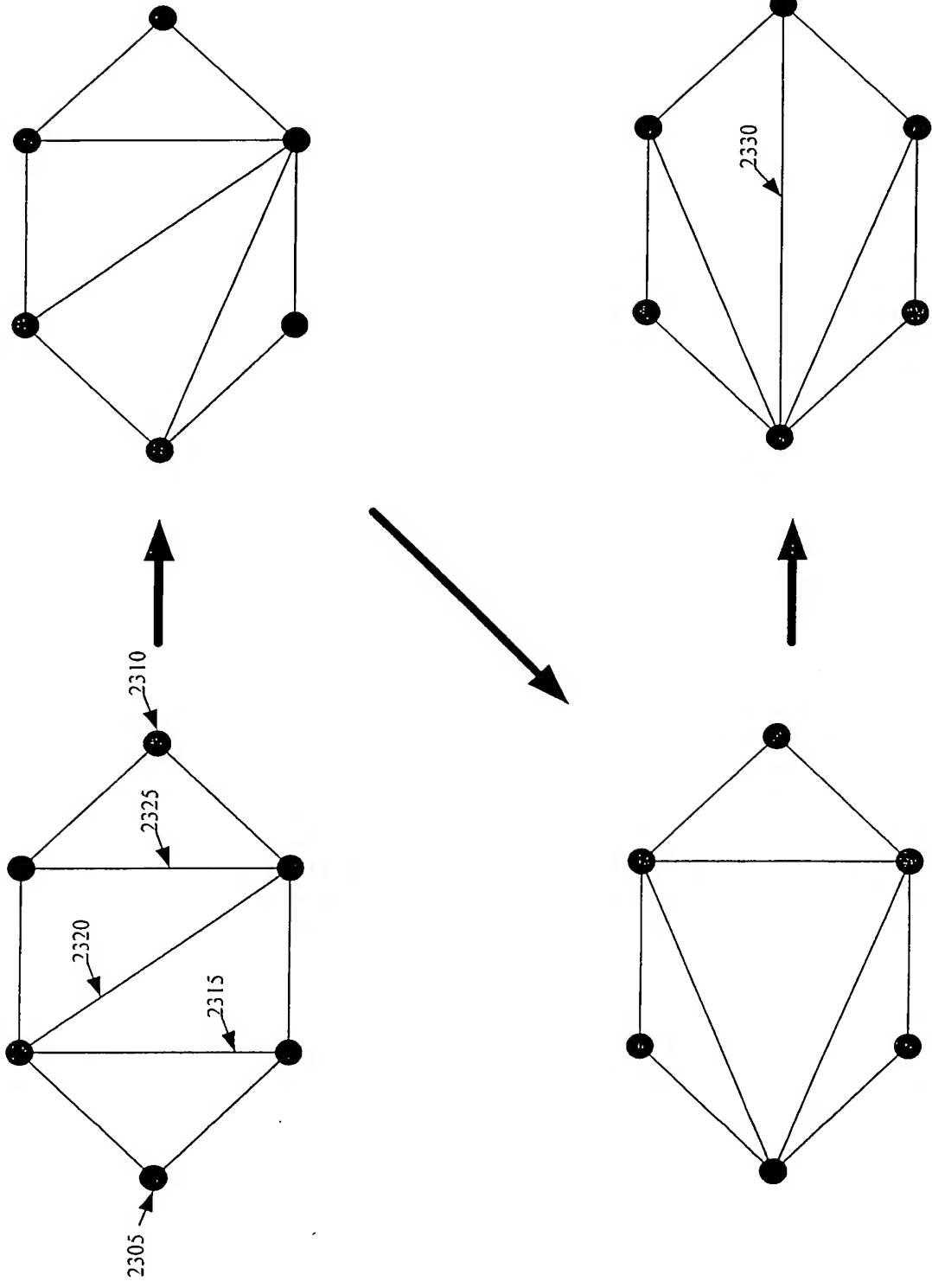


Figure 23

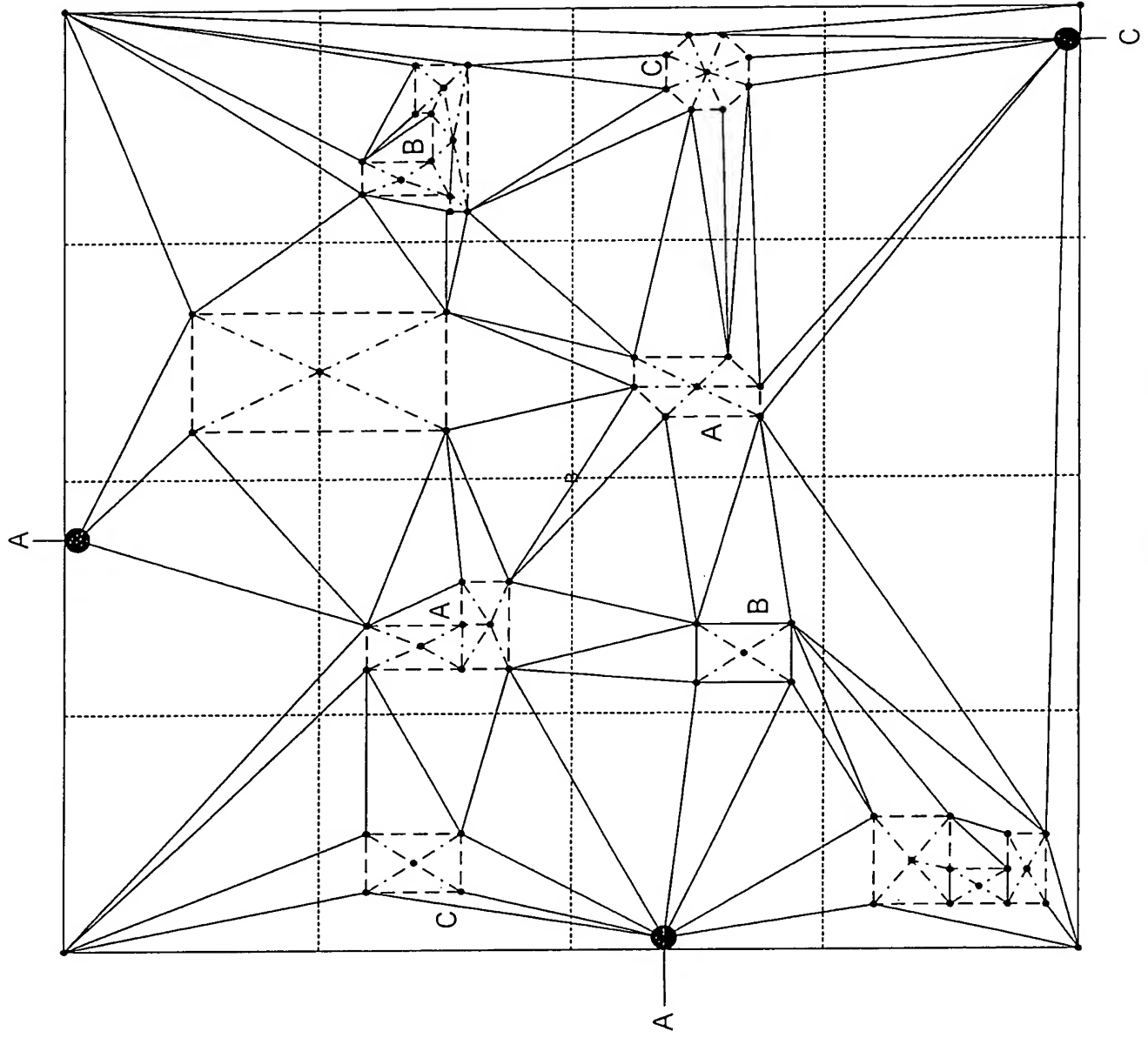
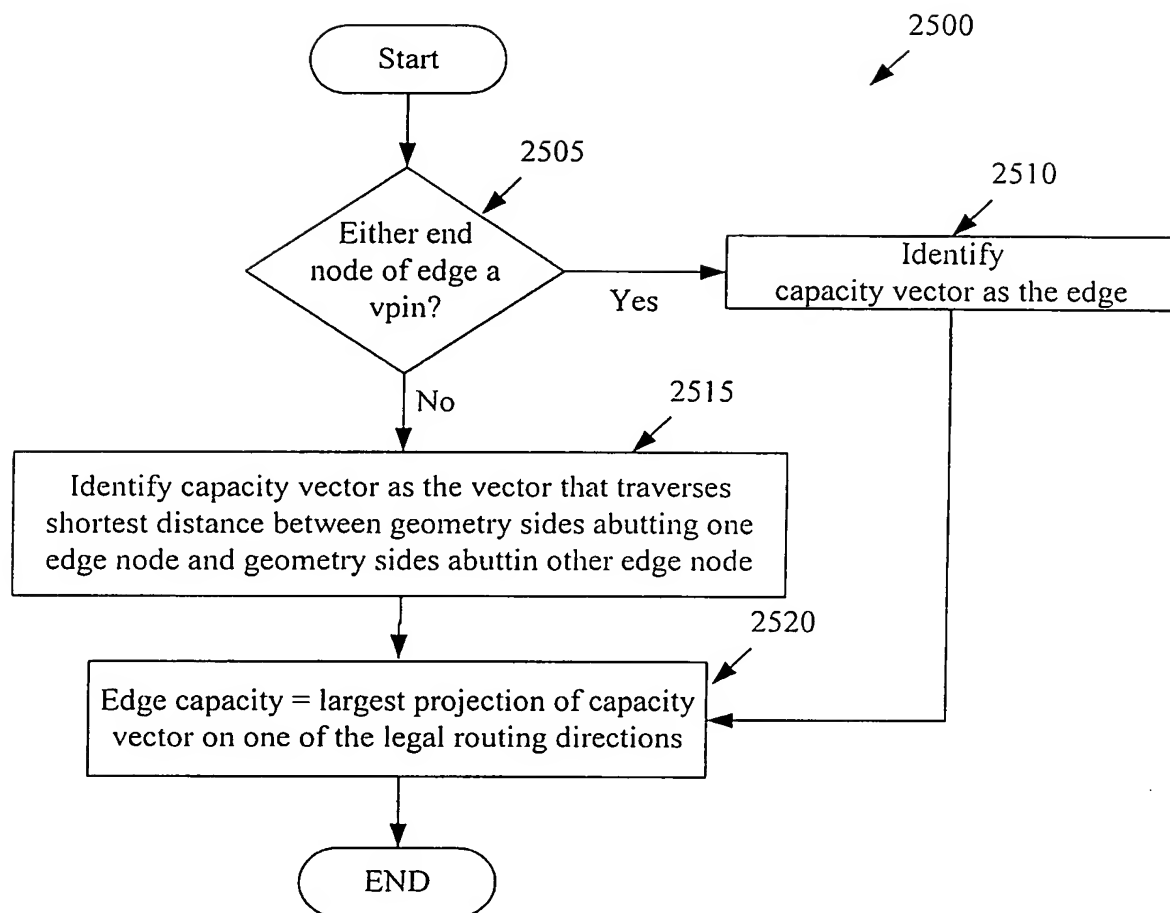


Figure 24



*Figure 25*

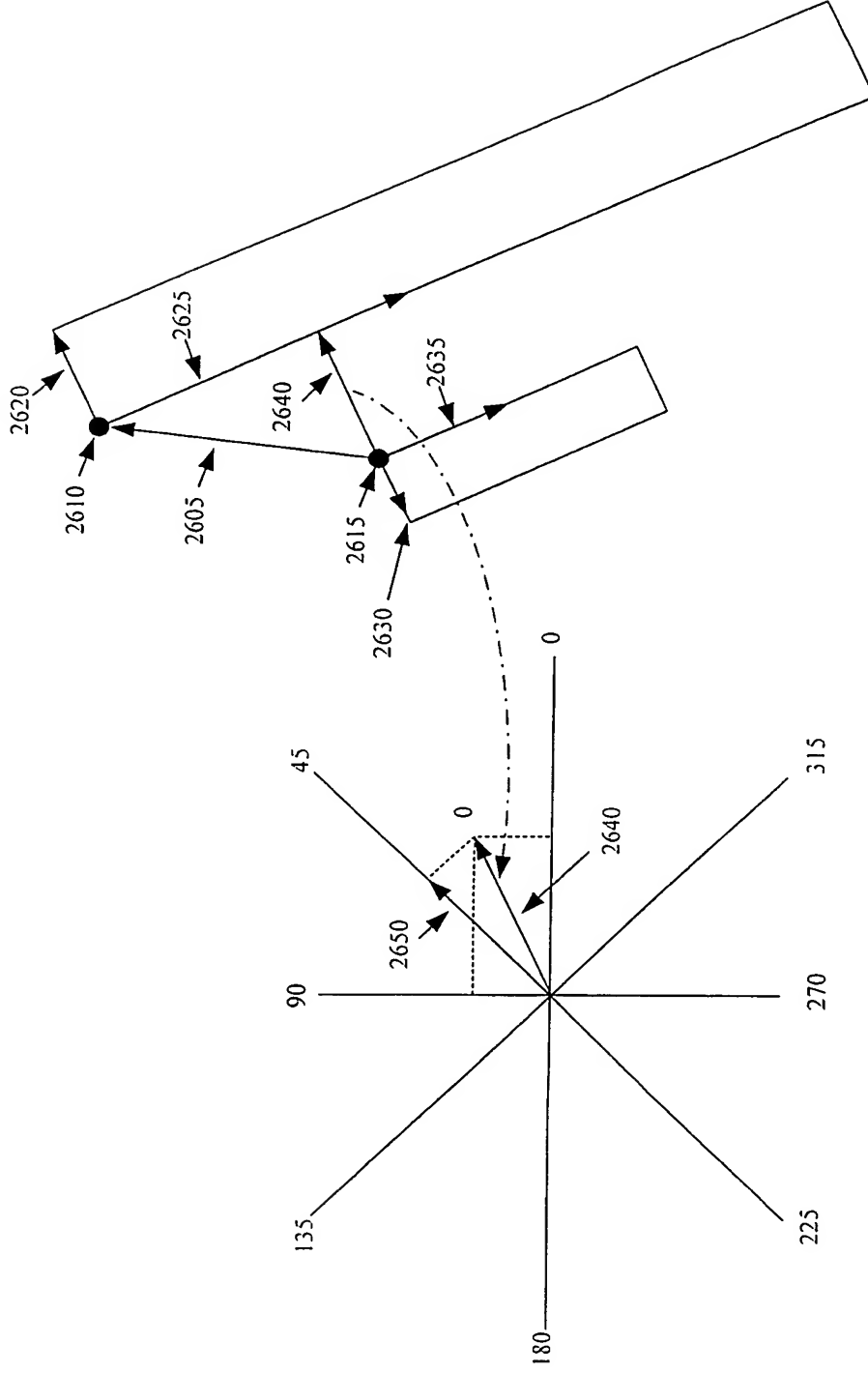


Figure 26

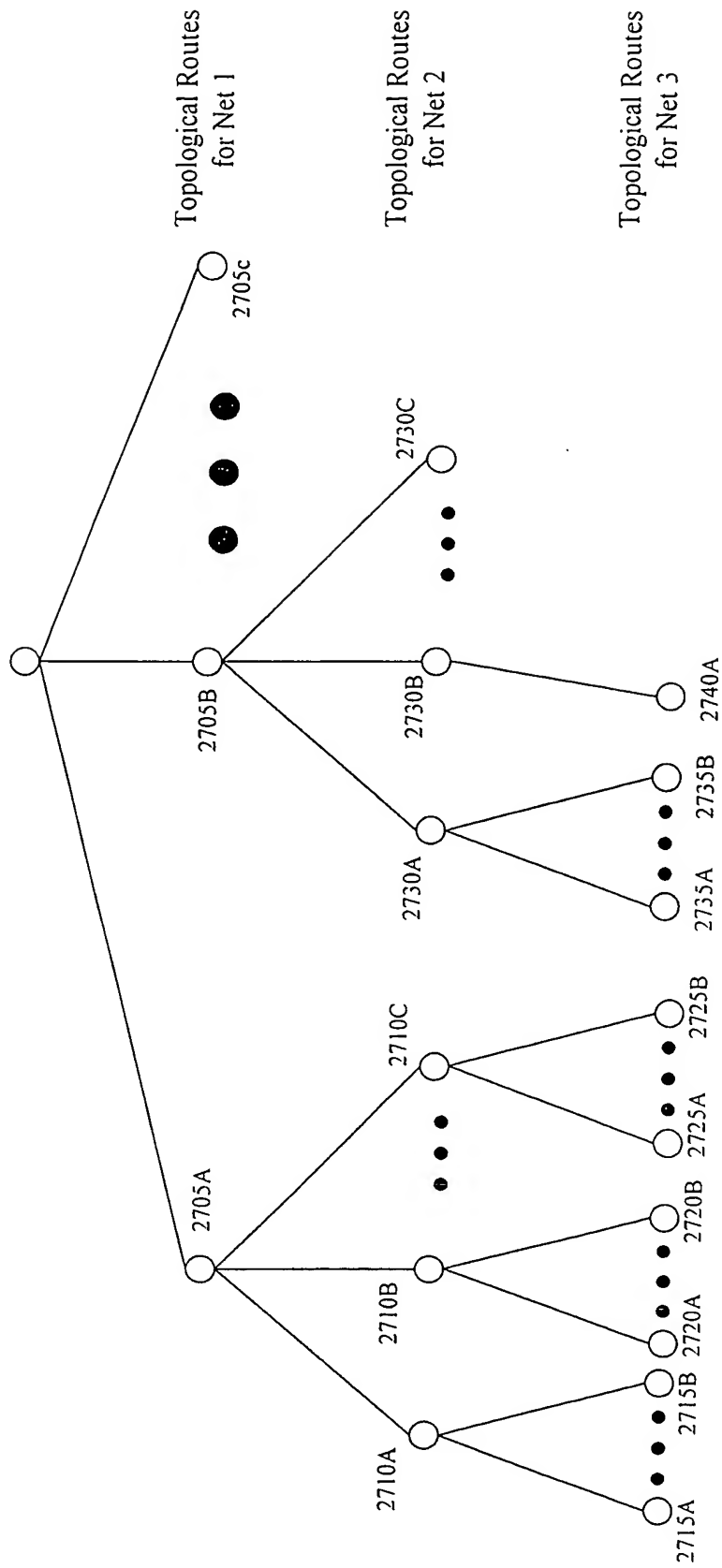
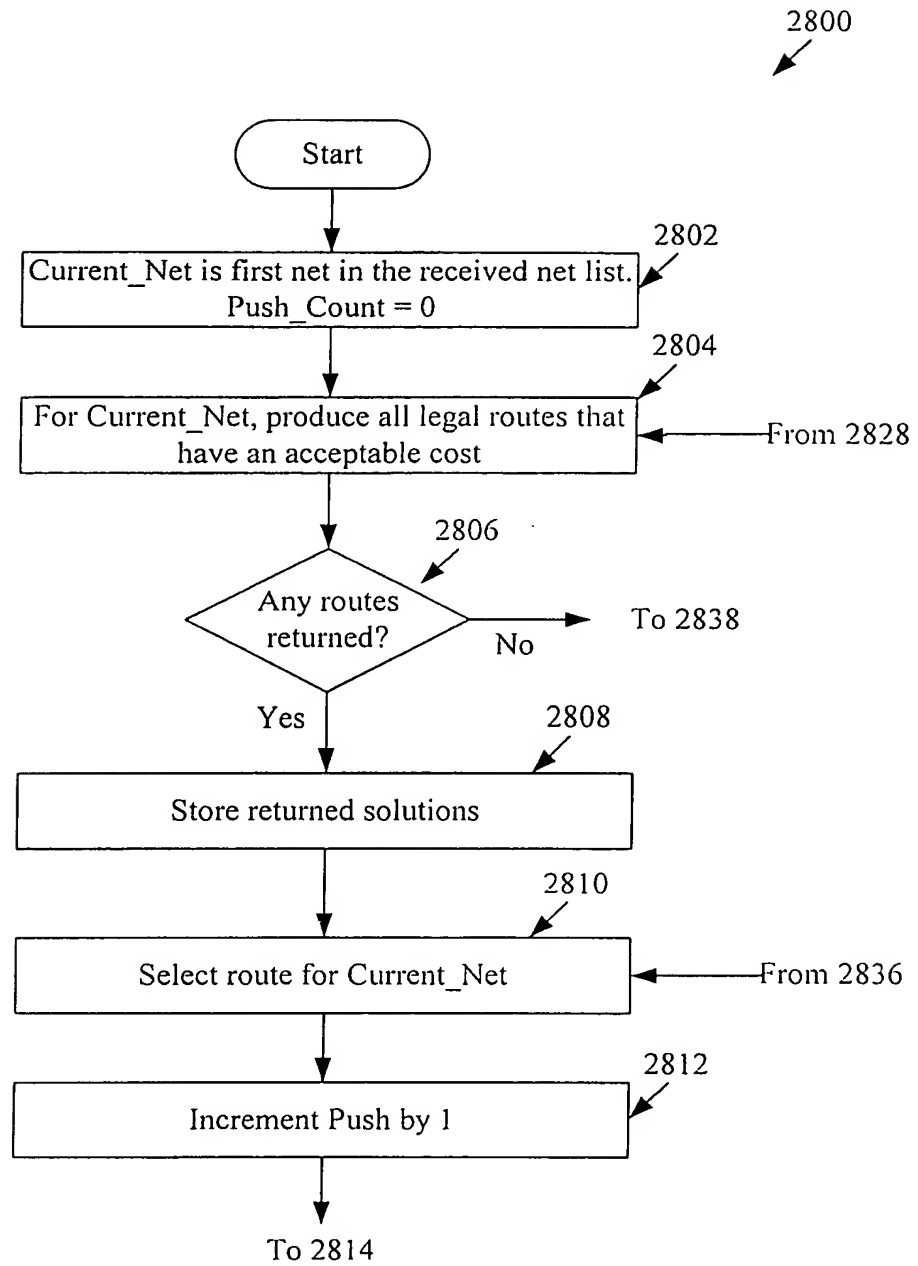
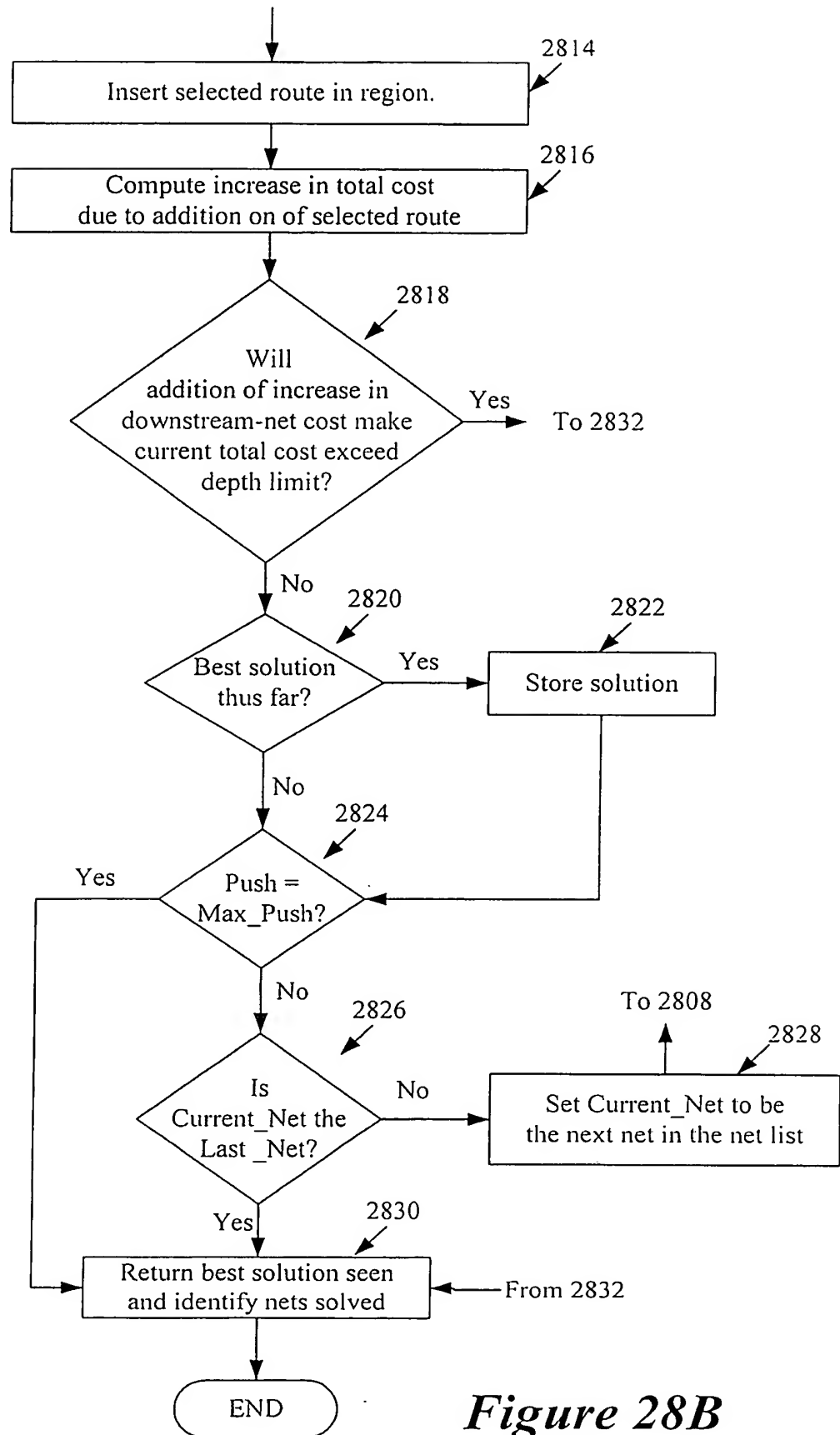


Figure 27

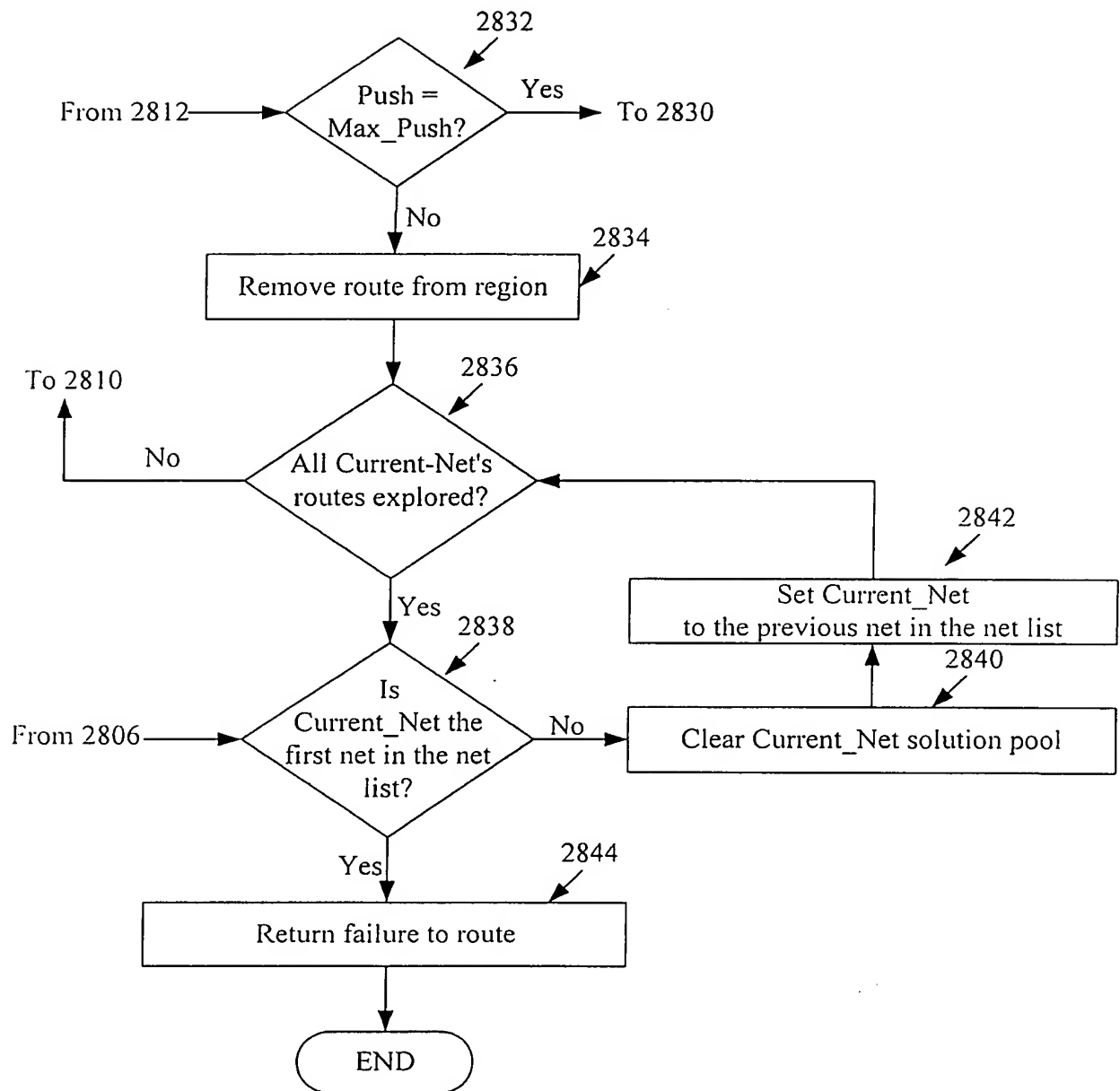


*Figure 28A*

*Figure 28:*  $\frac{\text{Figure 28A}}{\frac{\text{Figure 28B}}{\text{Figure 28C}}}$

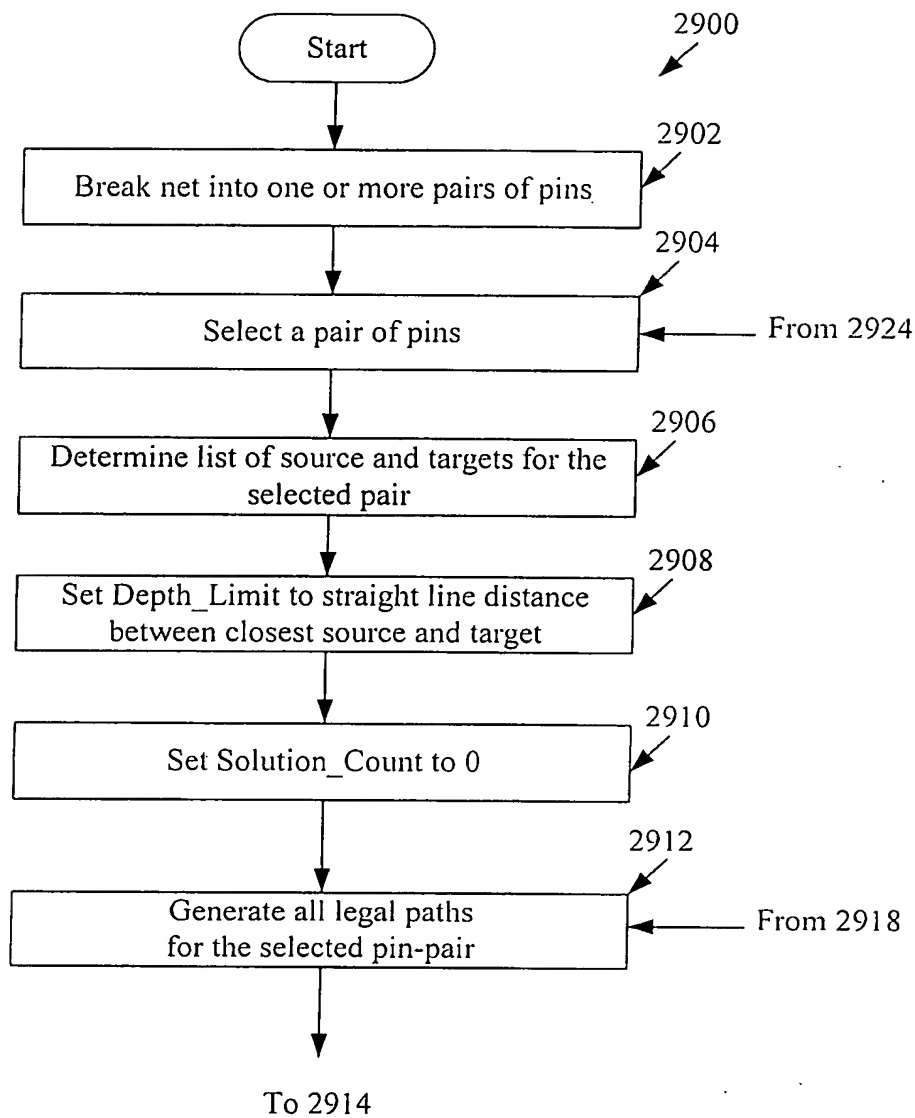


**Figure 28B**



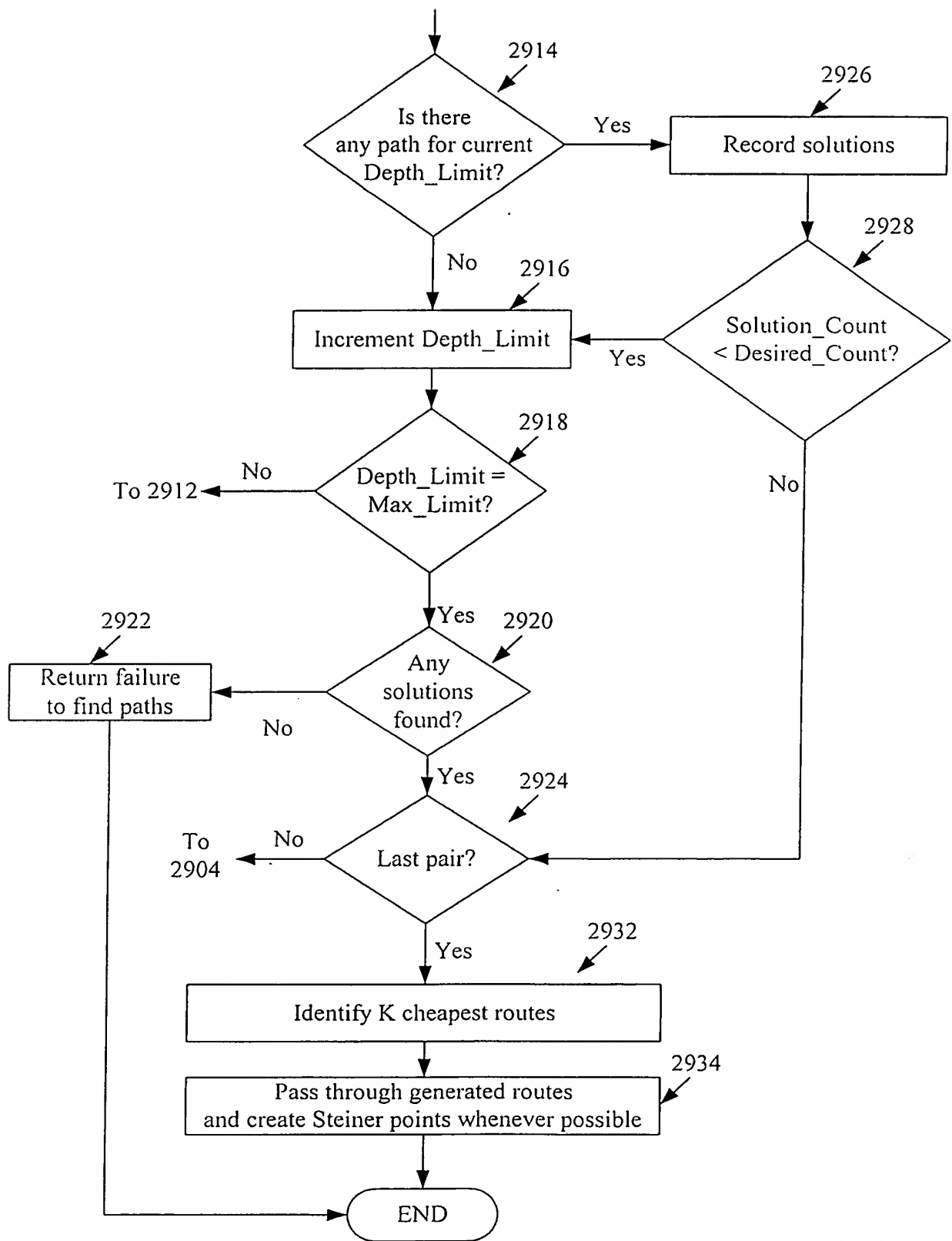
*Figure 28C*





*Figure 29A*

*Figure 29:  $\frac{\text{Figure 29A}}{\text{Figure 29B}}$*



*Figure 29B*

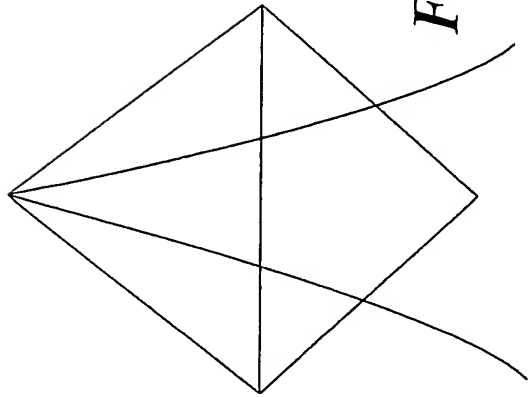


Figure 30A

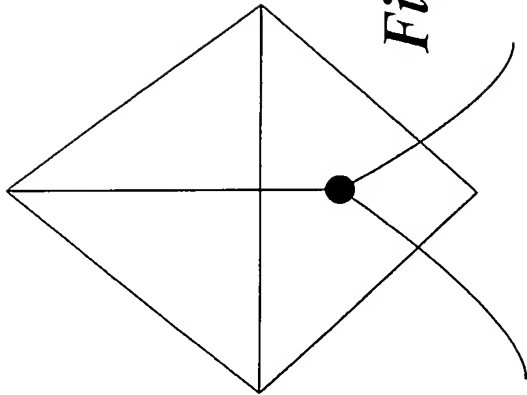


Figure 30B

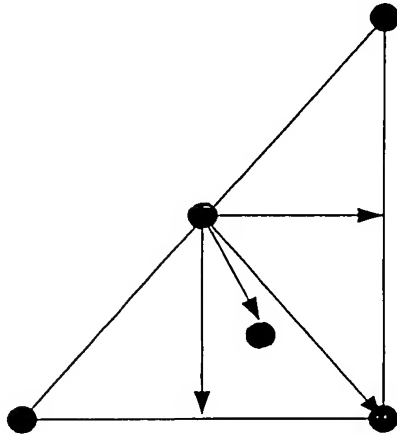


Figure 32

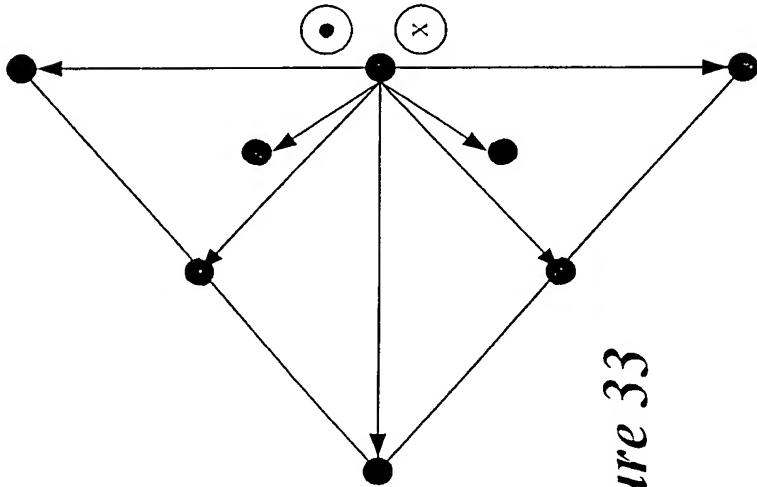


Figure 33

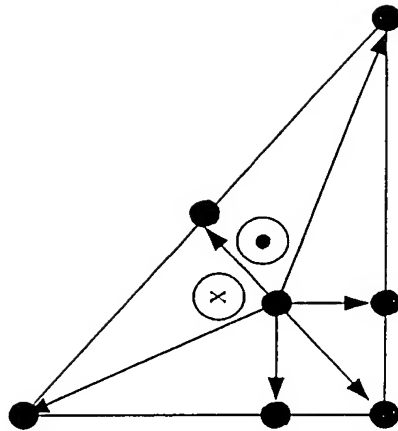
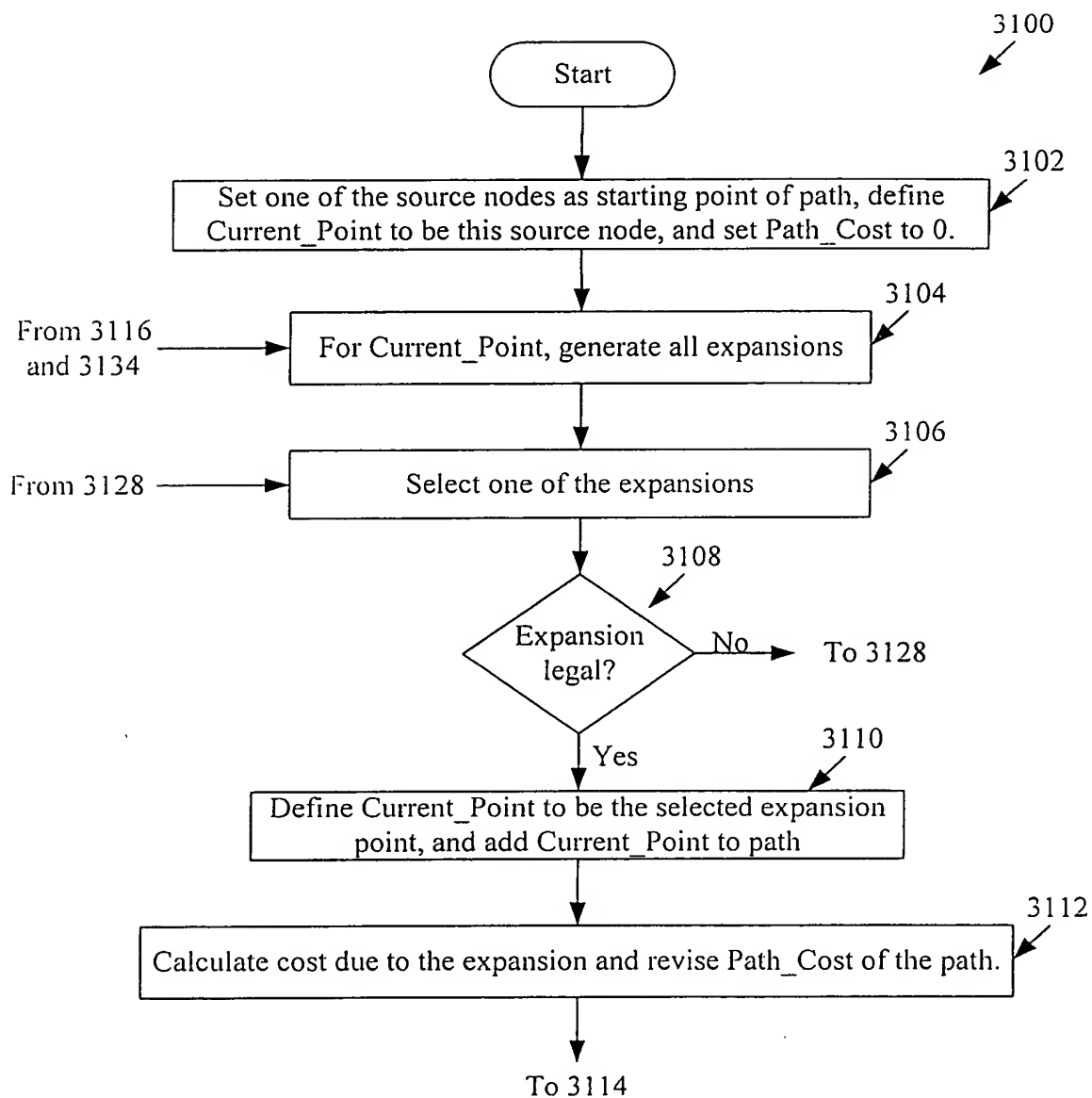


Figure 34

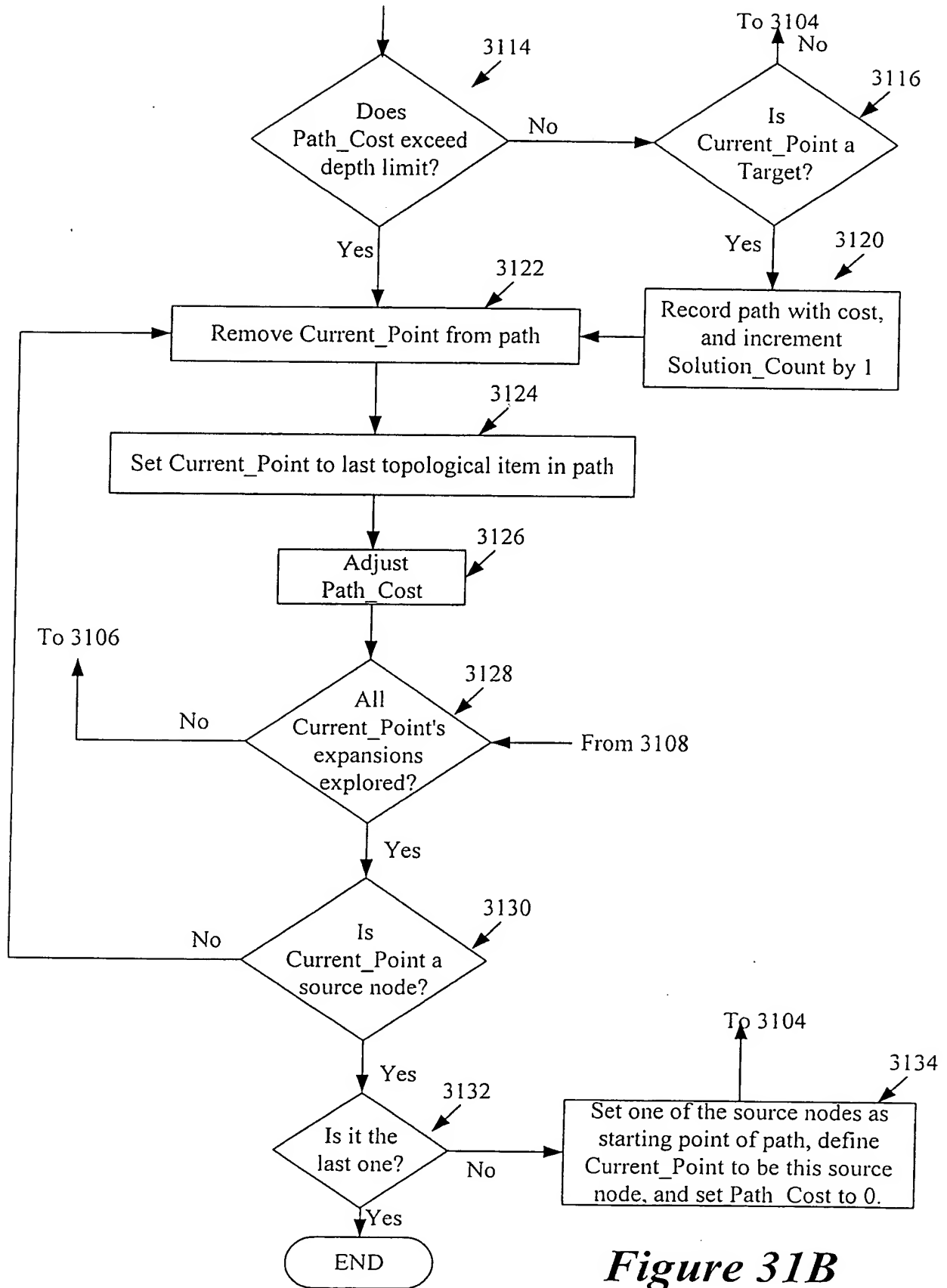
202250 4409900T 10066047 052200



*Figure 31A*

*Figure 31:  $\frac{\text{Figure 31A}}{\text{Figure 31B}}$*

202250 2409900T 10065047 0522202



*Figure 31B*

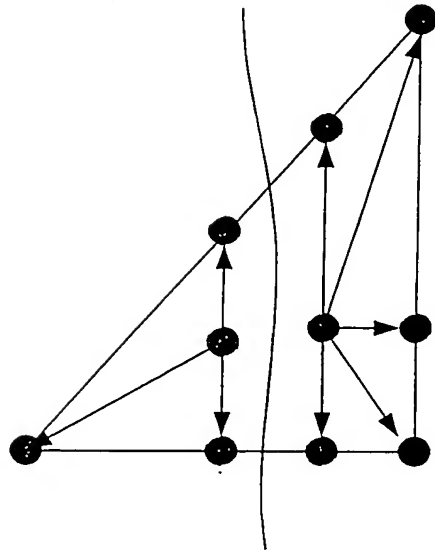


Figure 35

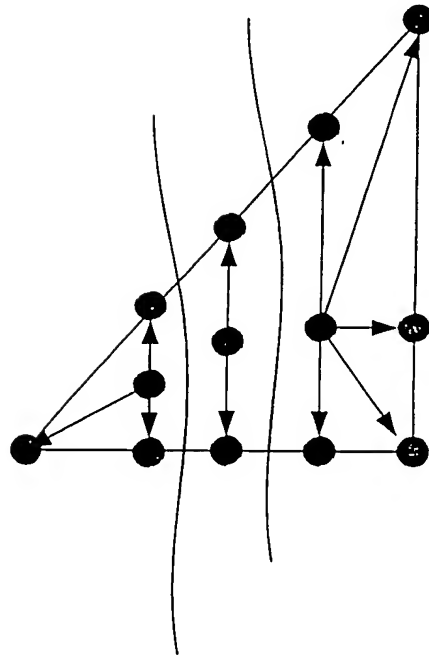


Figure 36

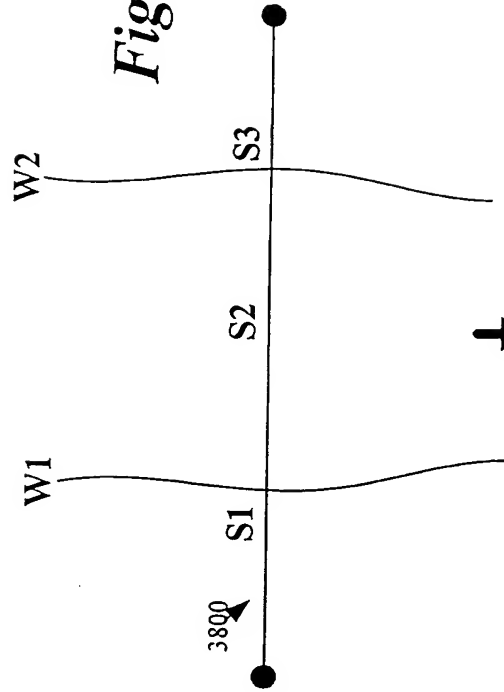


Figure 38A

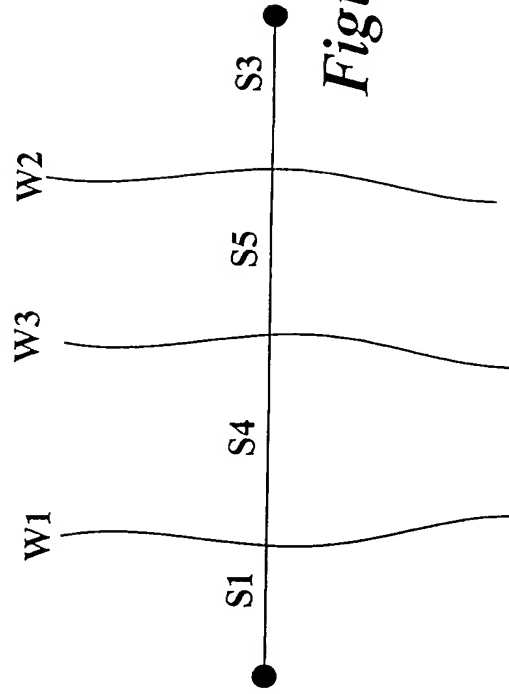
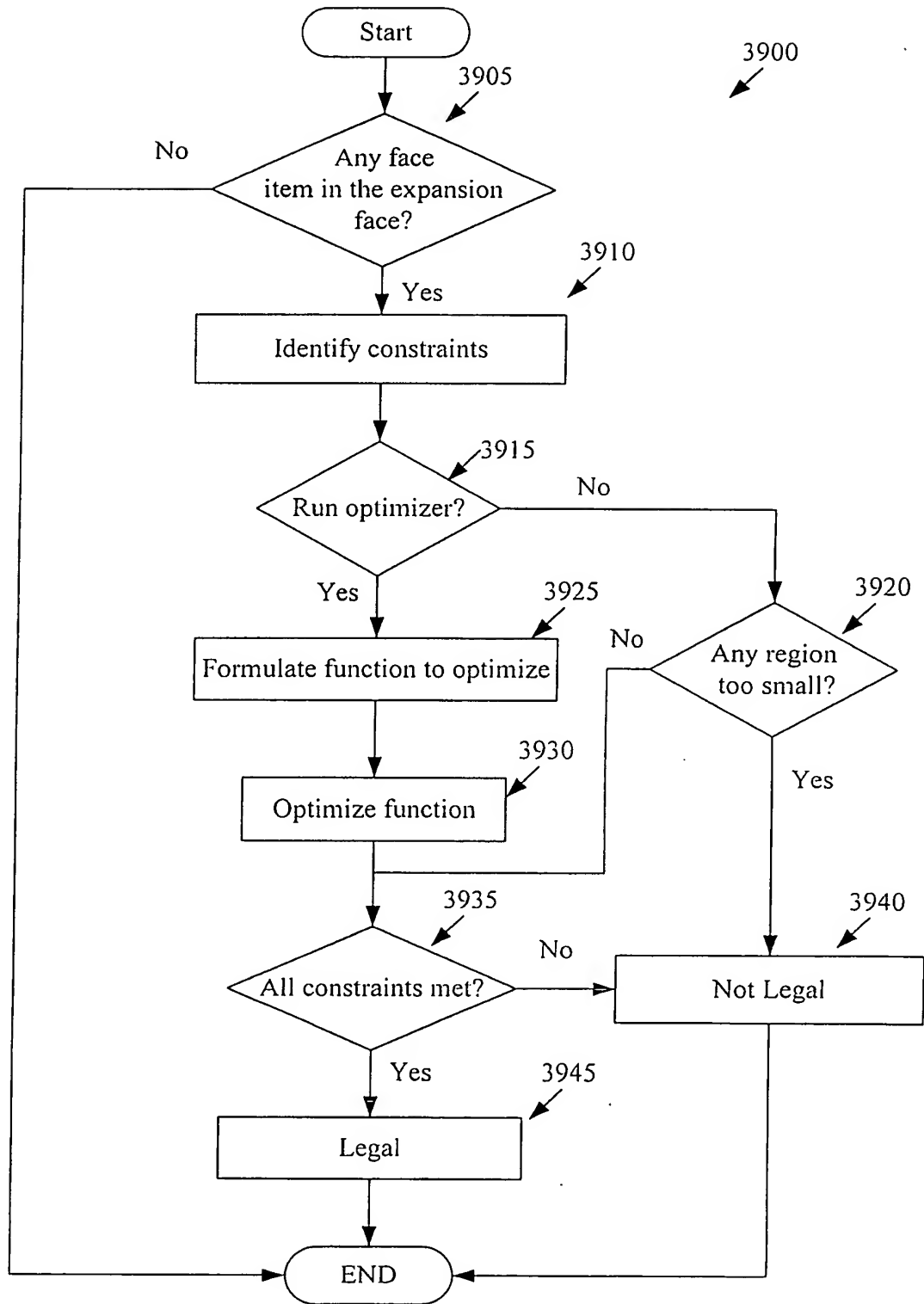


Figure 38B

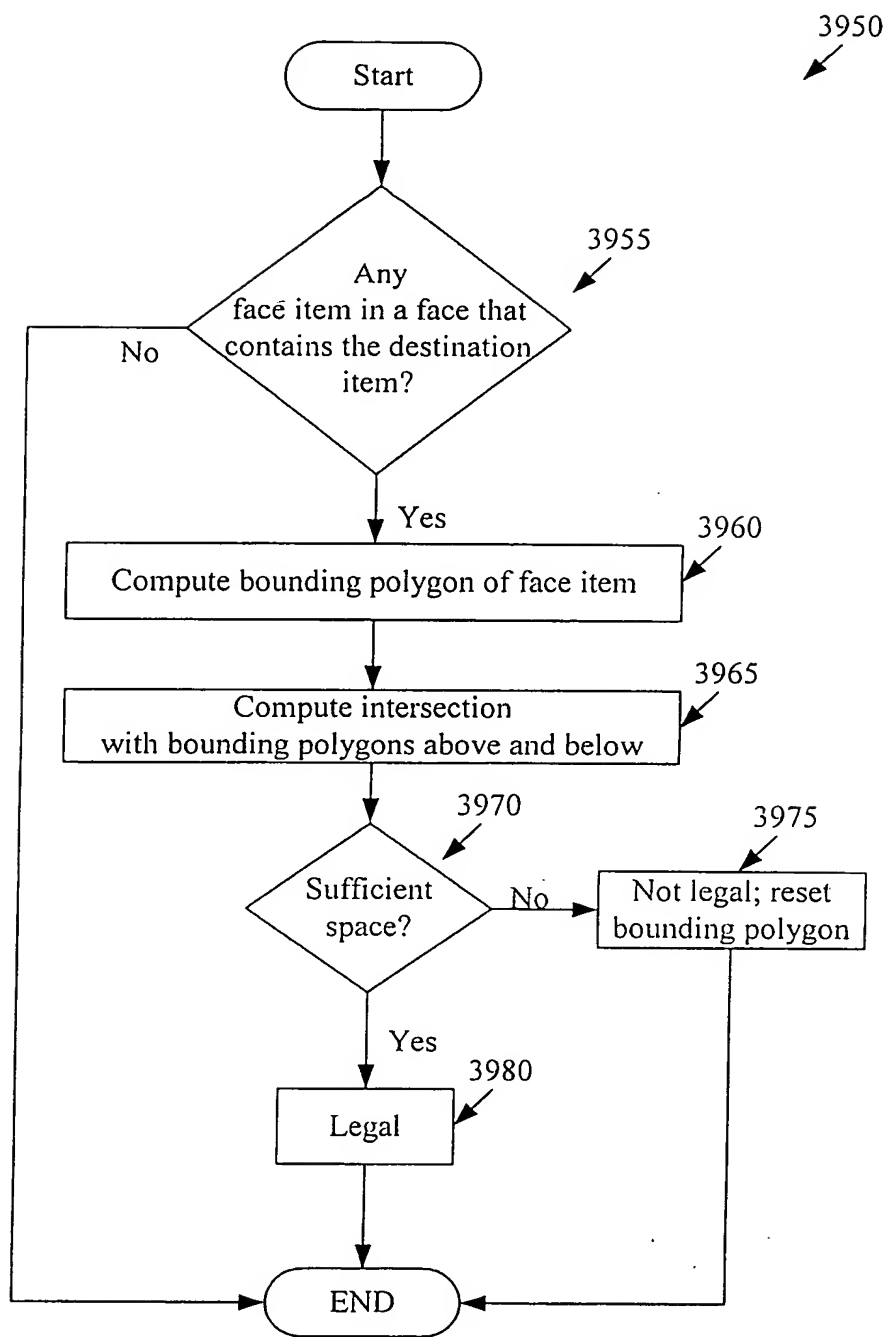
To:		Node	Face Item	Edge Item
From:	Node	<ul style="list-style-type: none"><li>• Planarity</li><li>• Vias</li></ul>	<ul style="list-style-type: none"><li>• Vias</li></ul>	<ul style="list-style-type: none"><li>• Planarity</li><li>• Vias</li><li>• Edge Capacity</li></ul>
Face Item		<ul style="list-style-type: none"><li>• Vias</li></ul>	<ul style="list-style-type: none"><li>• Vias</li></ul>	<ul style="list-style-type: none"><li>• Vias</li><li>• Edge Capacity</li></ul>
Edge Item		<ul style="list-style-type: none"><li>• Planarity</li><li>• Vias</li></ul>	<ul style="list-style-type: none"><li>• Vias</li></ul>	<ul style="list-style-type: none"><li>• Planarity</li><li>• Vias</li><li>• Edge Capacity</li></ul>

Figure 37

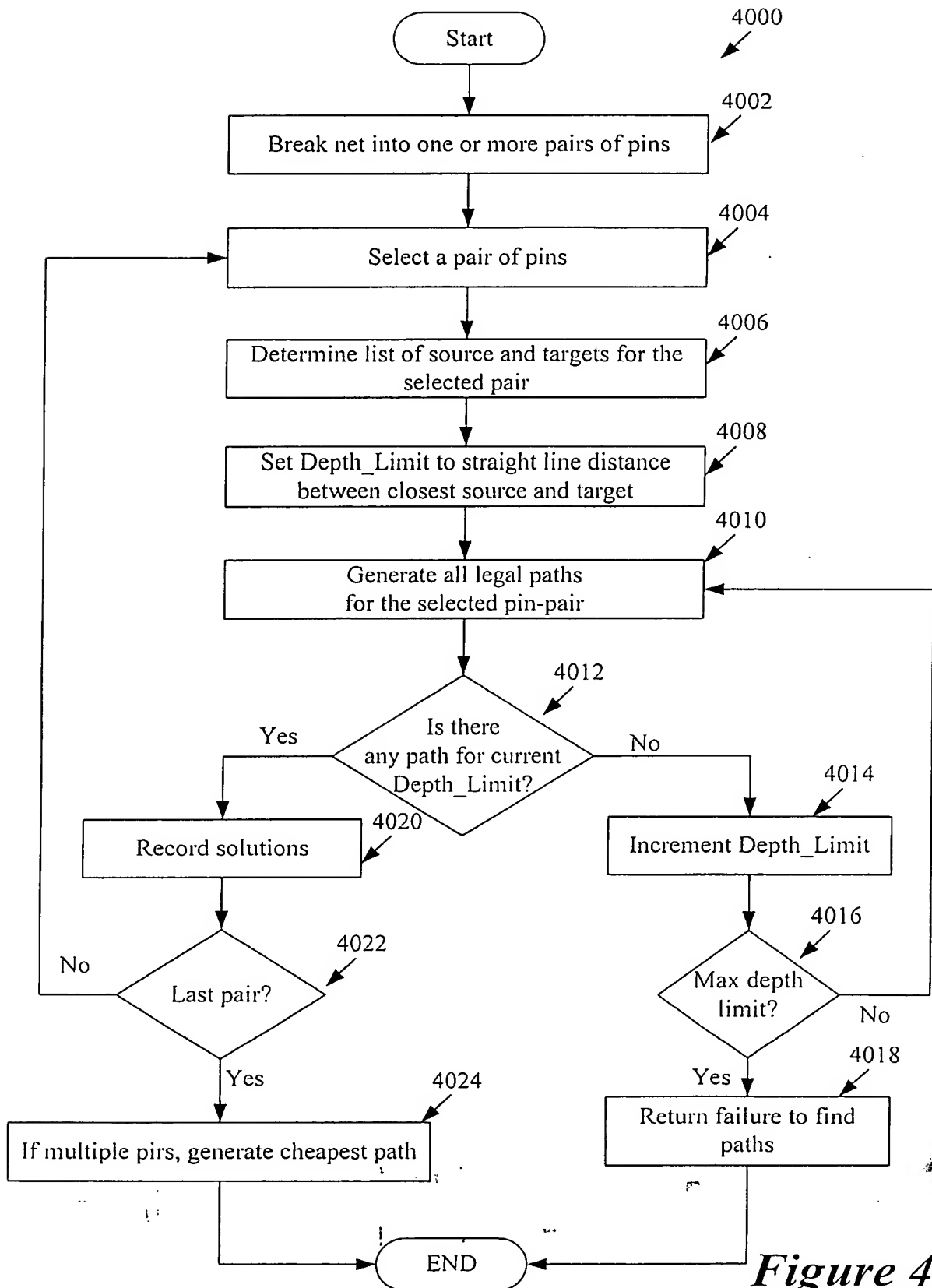


*Figure 39A*





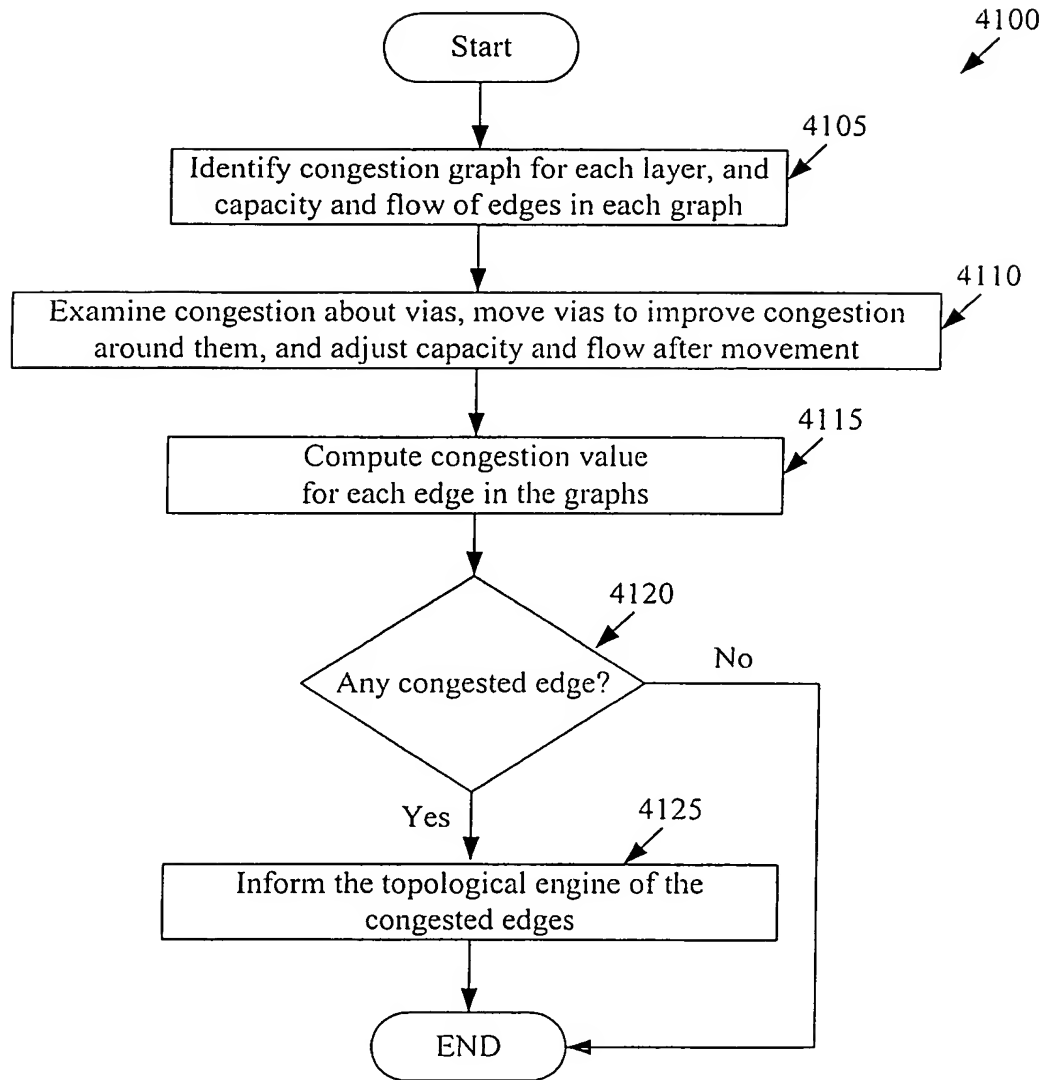
*Figure 39B*



**Figure 40**

106604 052202 20250 409001

202250 7405900T



*Figure 41*

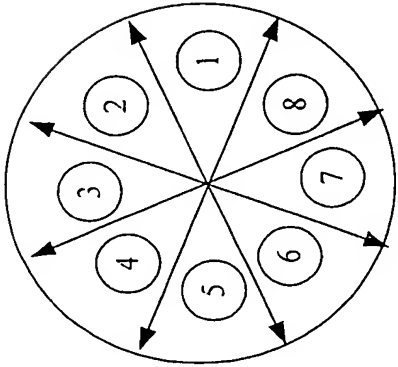


Figure 42

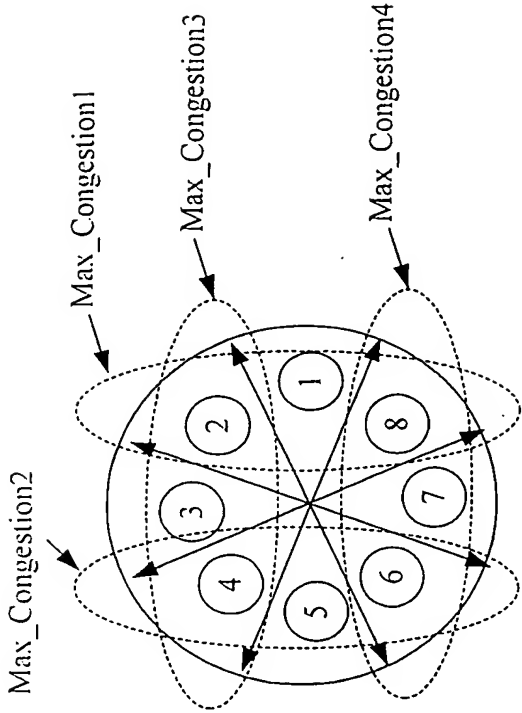


Figure 44

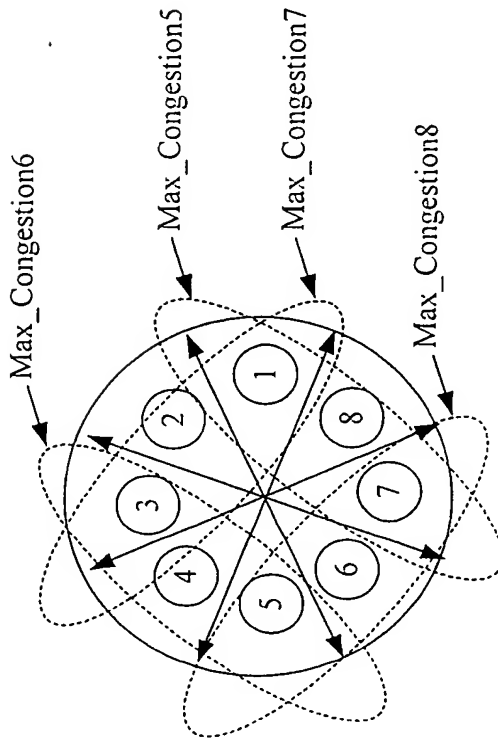


Figure 45

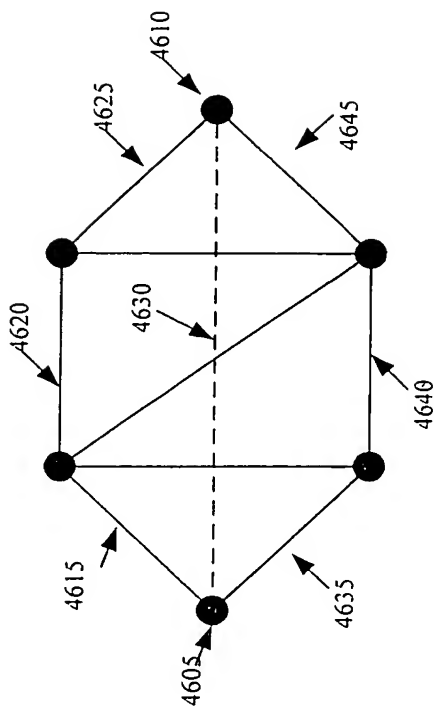
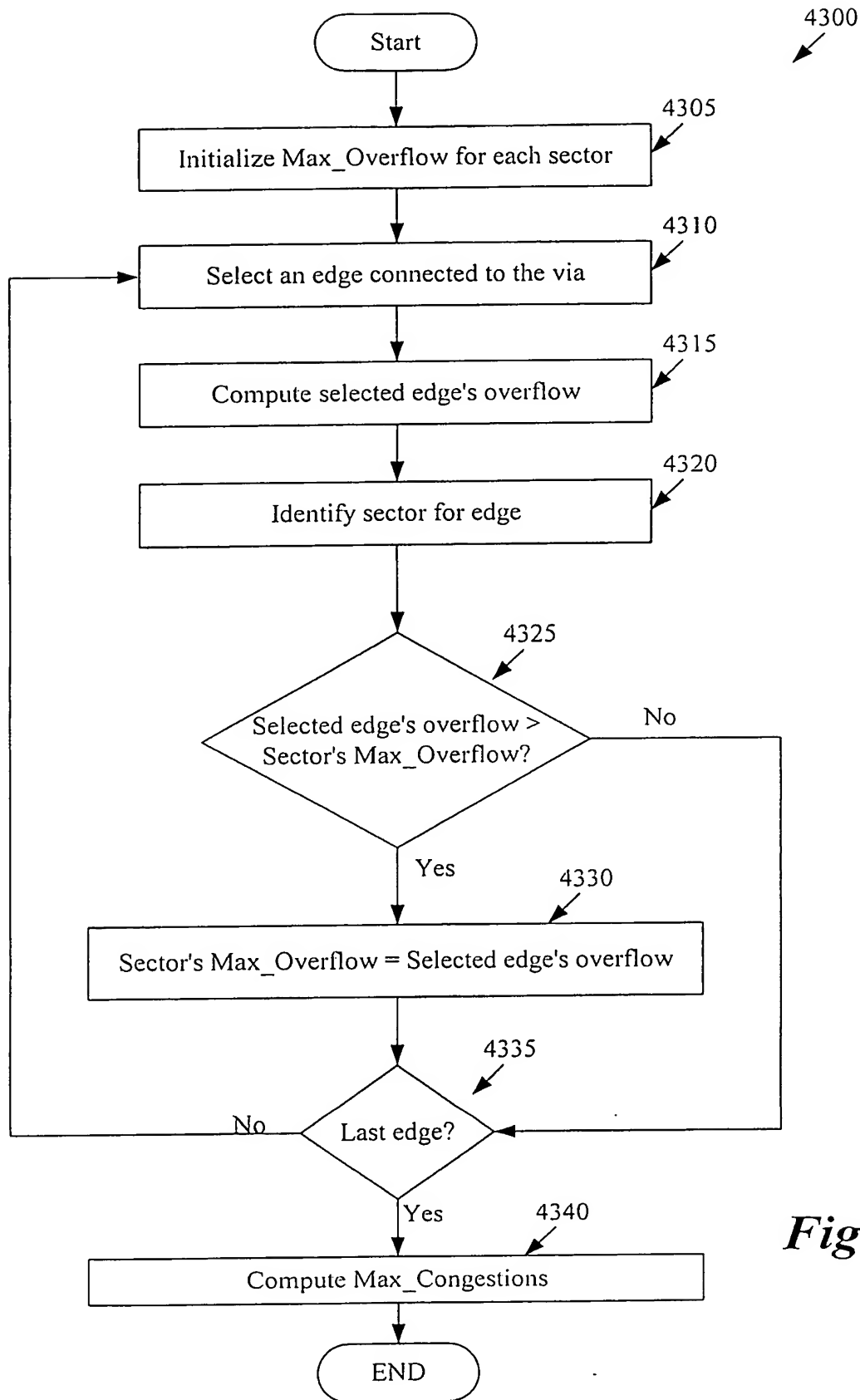
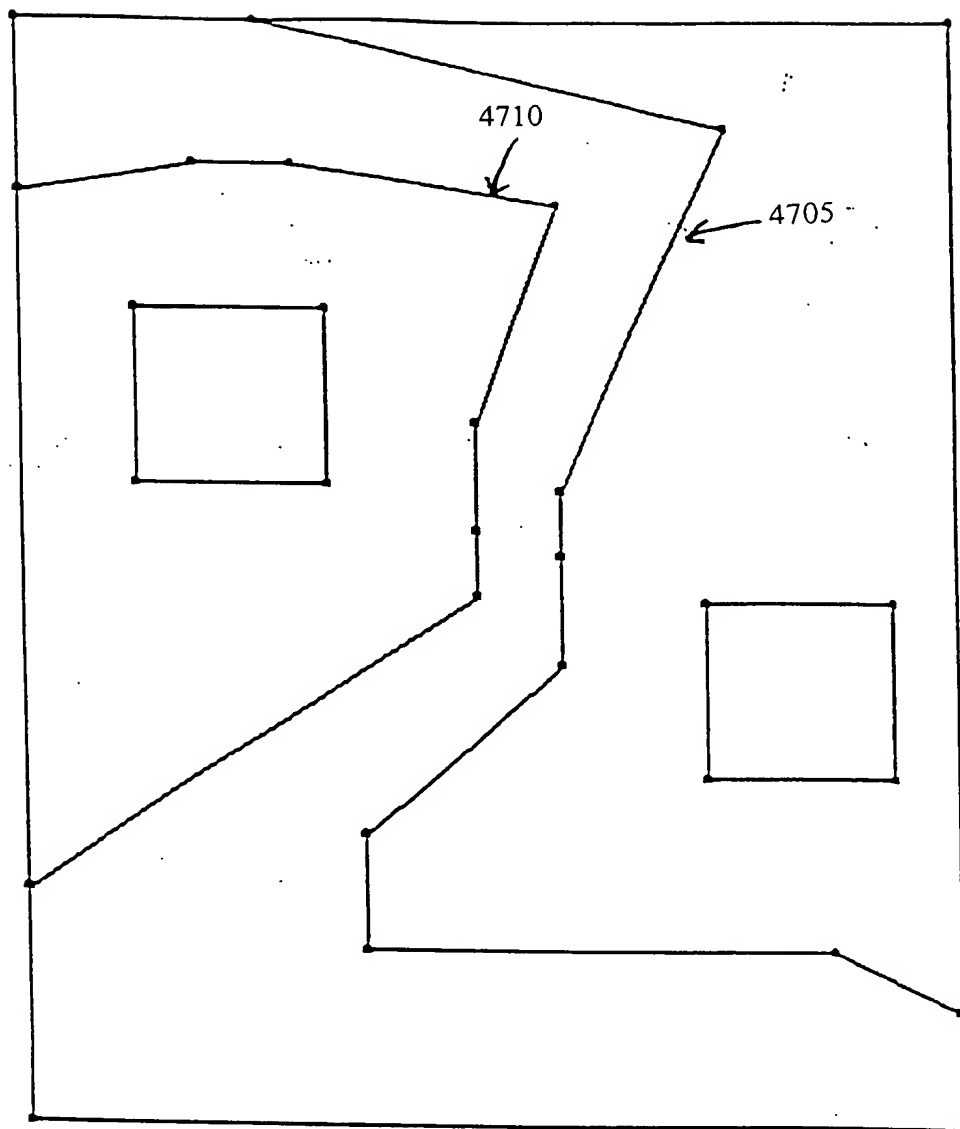


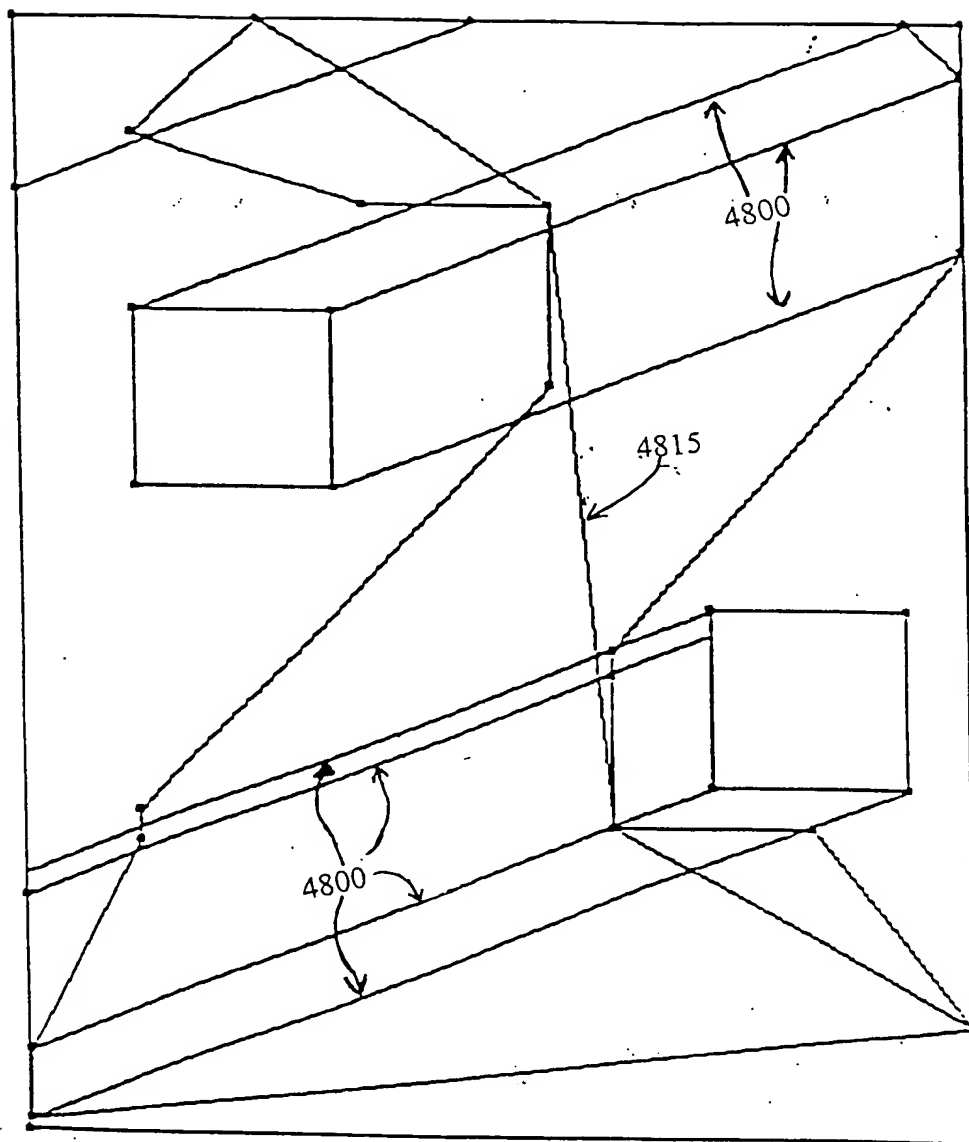
Figure 46



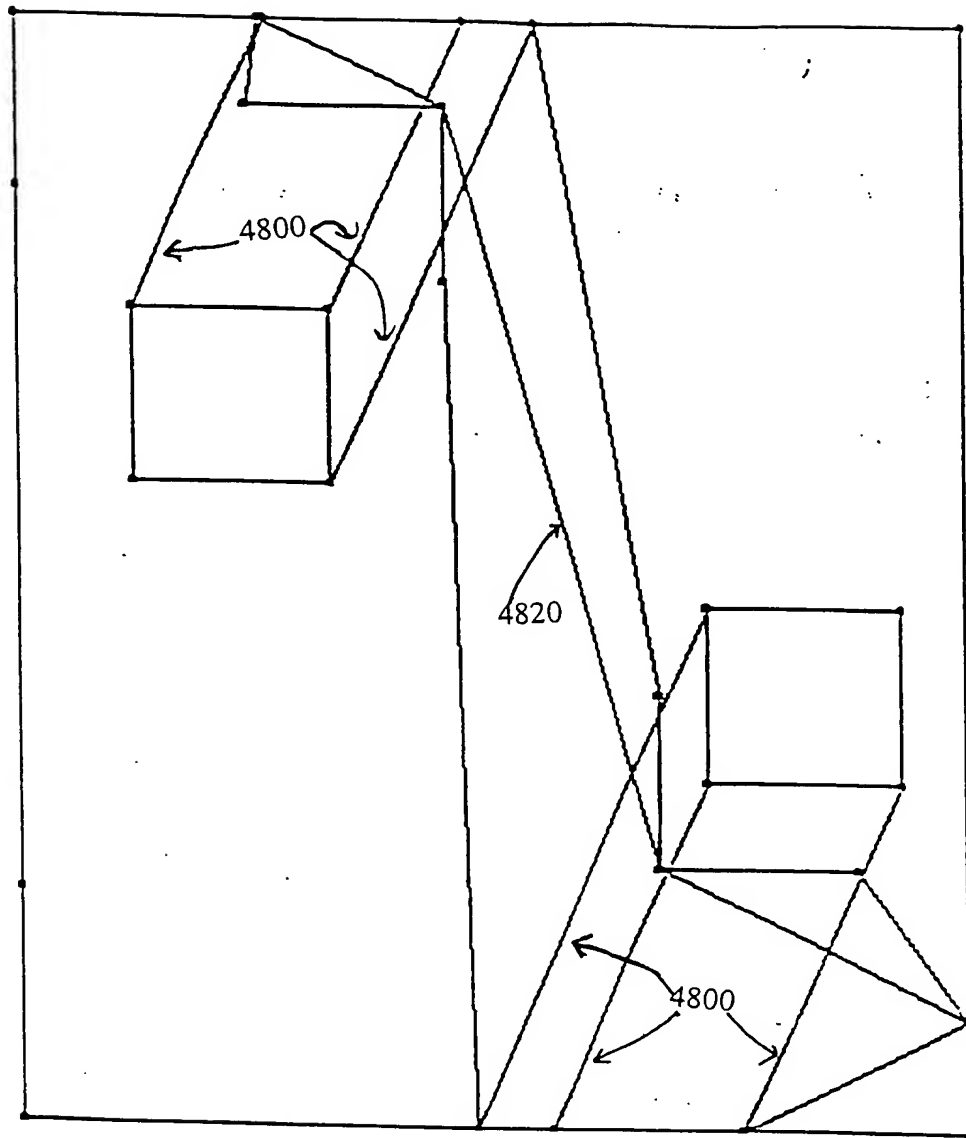
**Figure 43**



**FIGURE 47**

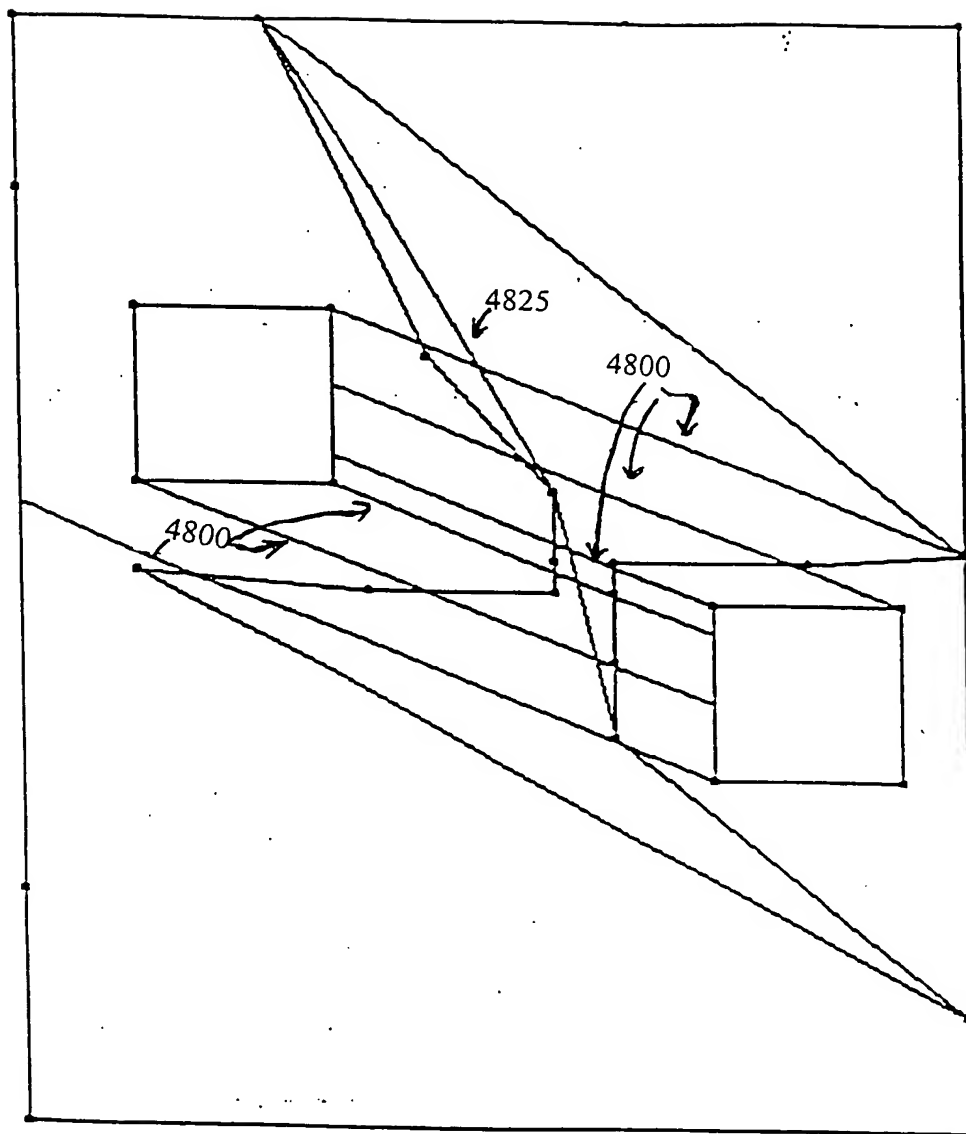


*FIGURE 48A*



**FIGURE 48B**

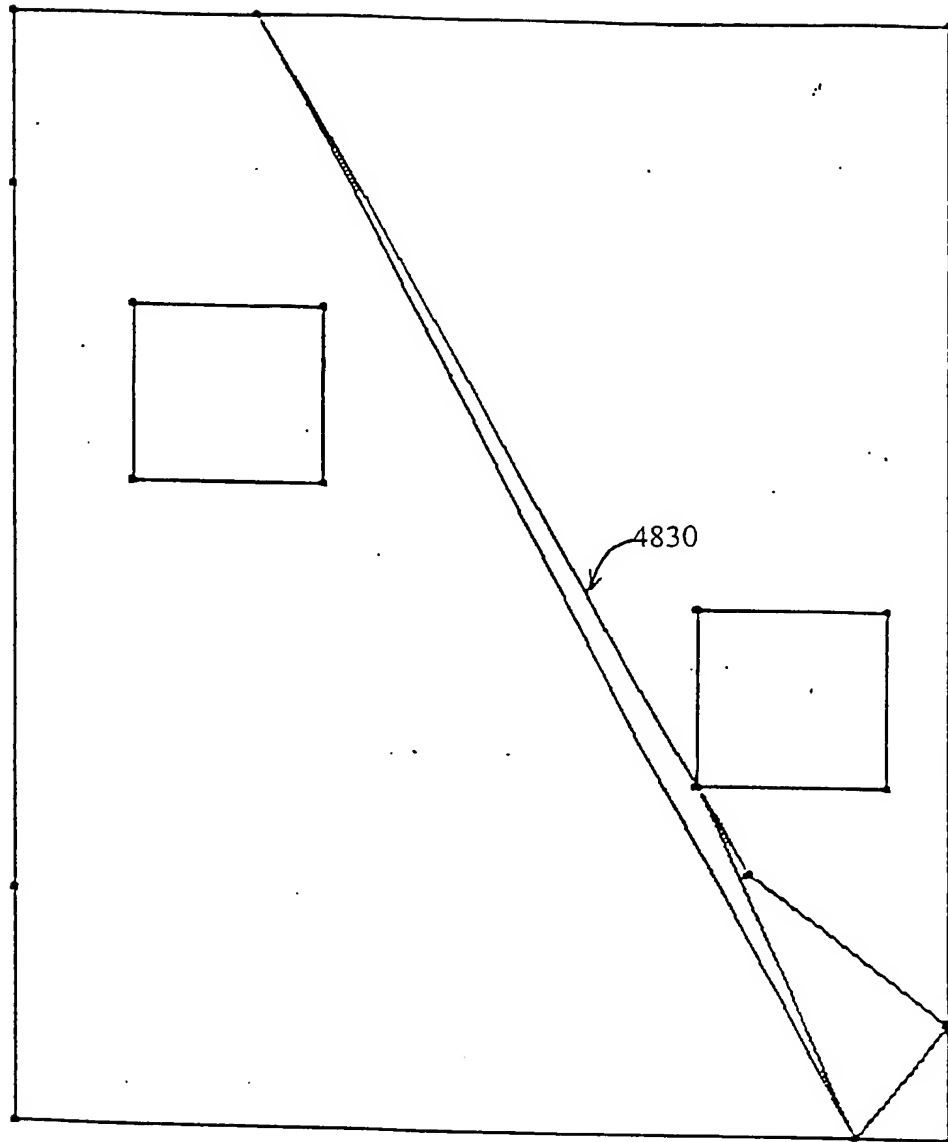




*FIGURE 48C*

202250" 409900T 10065047.052202

10066047-052202



*FIGURE 48D*

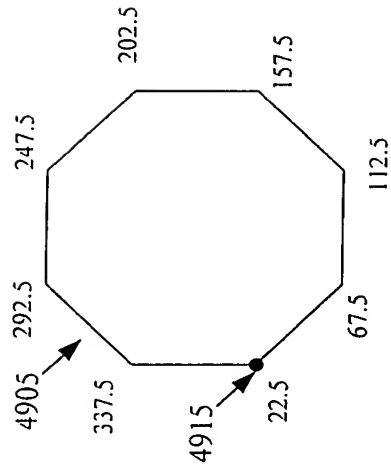


Figure 49A

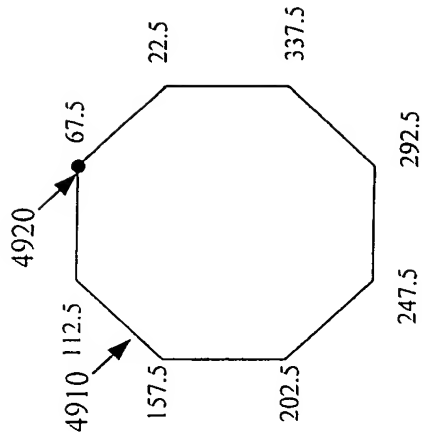


Figure 49B

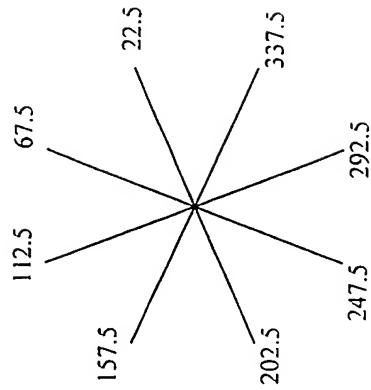
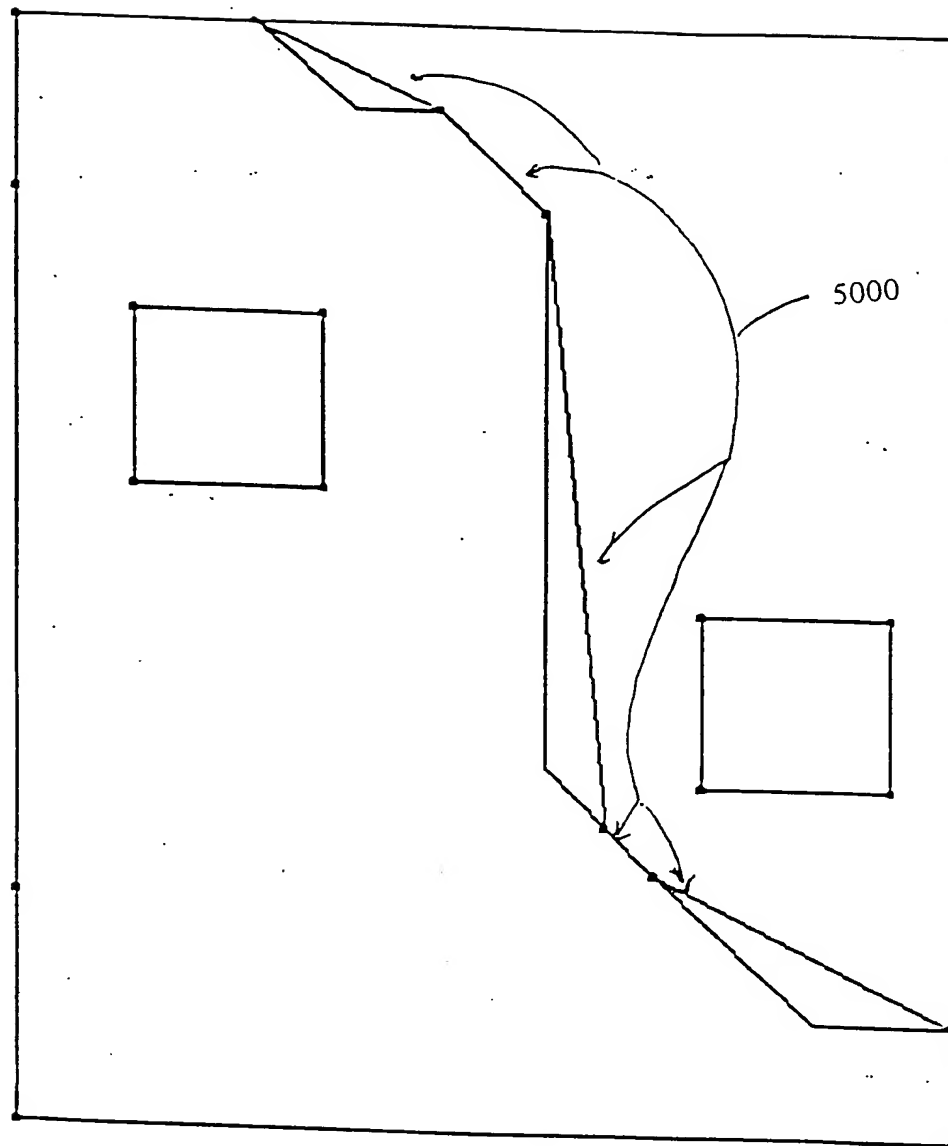


Figure 49C



**FIGURE 50**

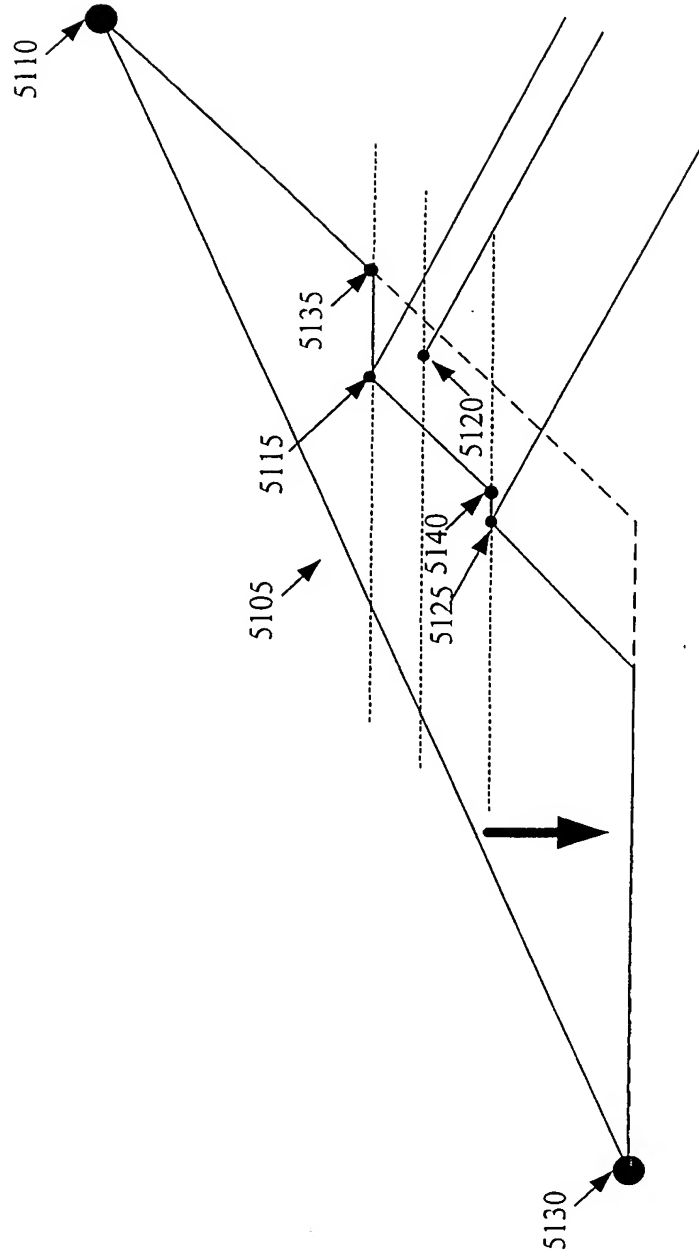
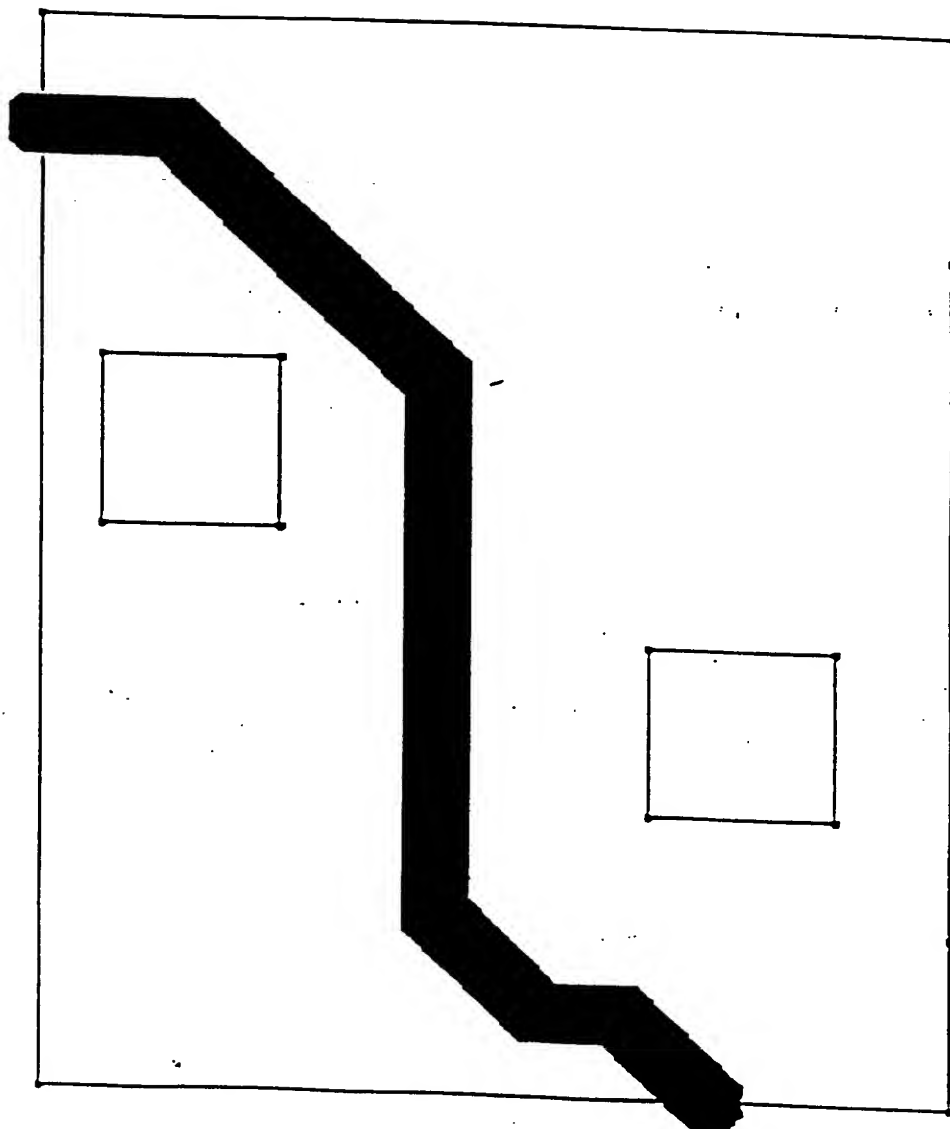
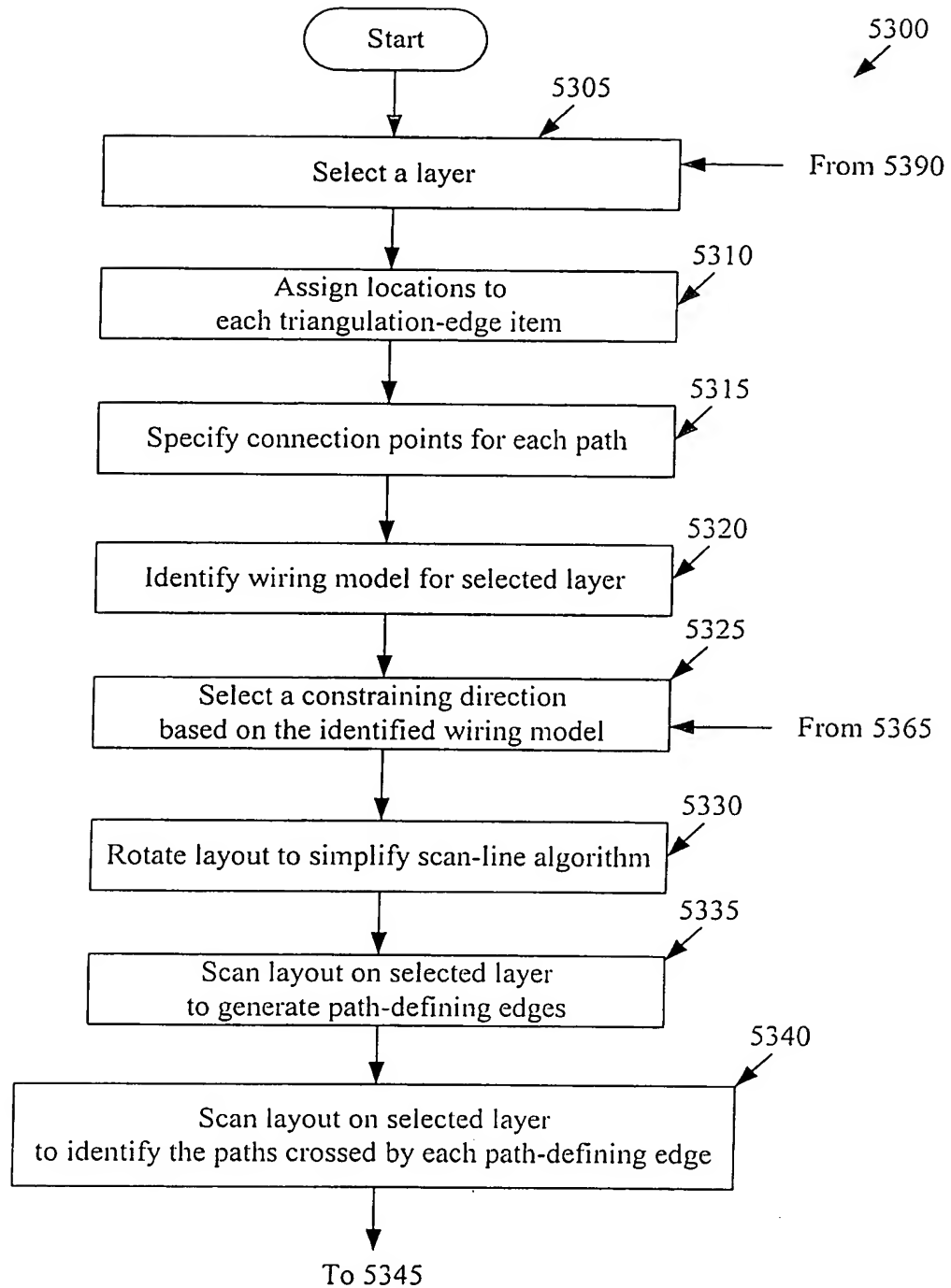


Figure 51

10066047 052202

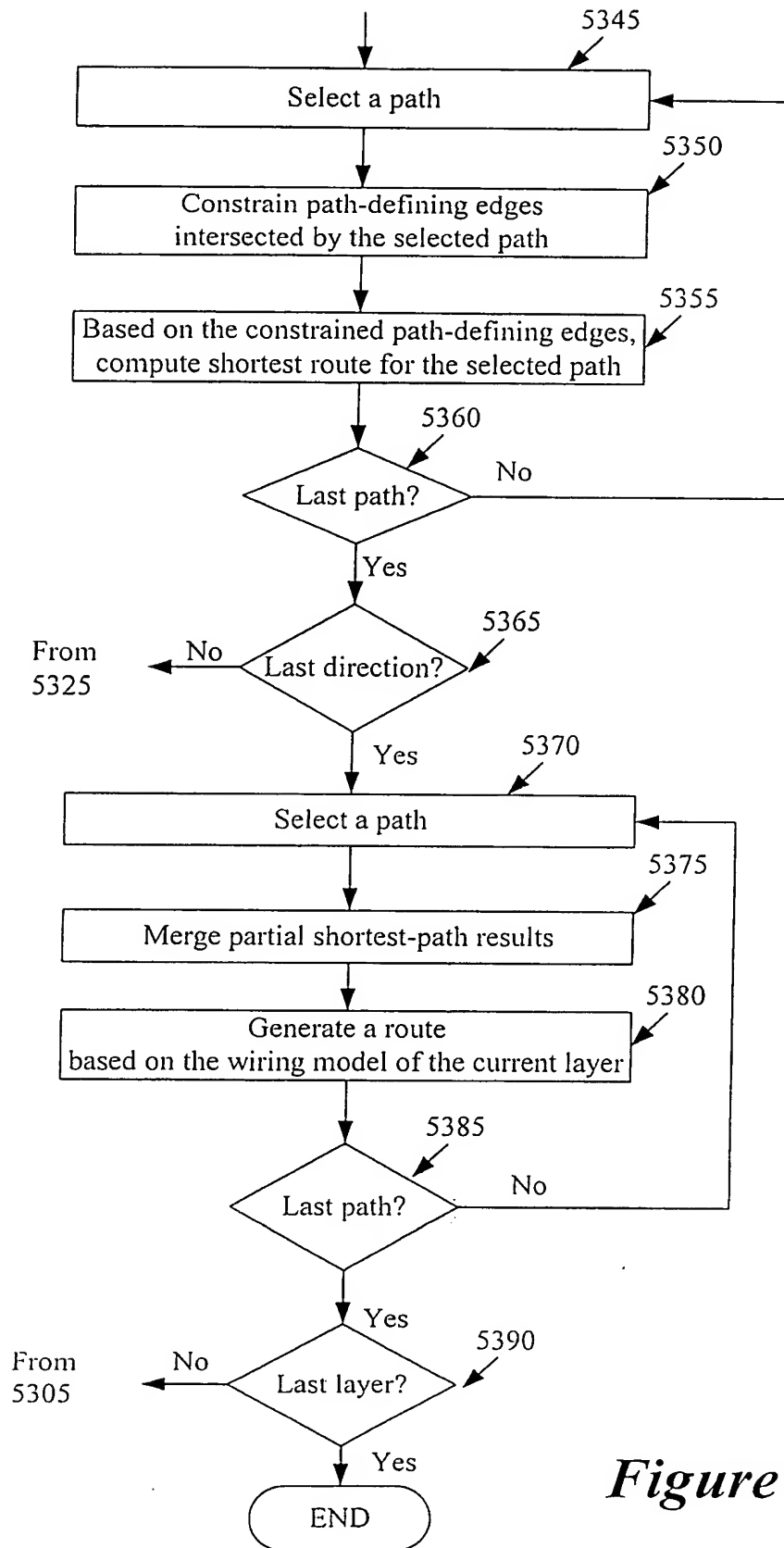


*FIGURE 52*



**Figure 53**

**Figure 53:** Figure 53A  
Figure 53B



*Figure 53B*



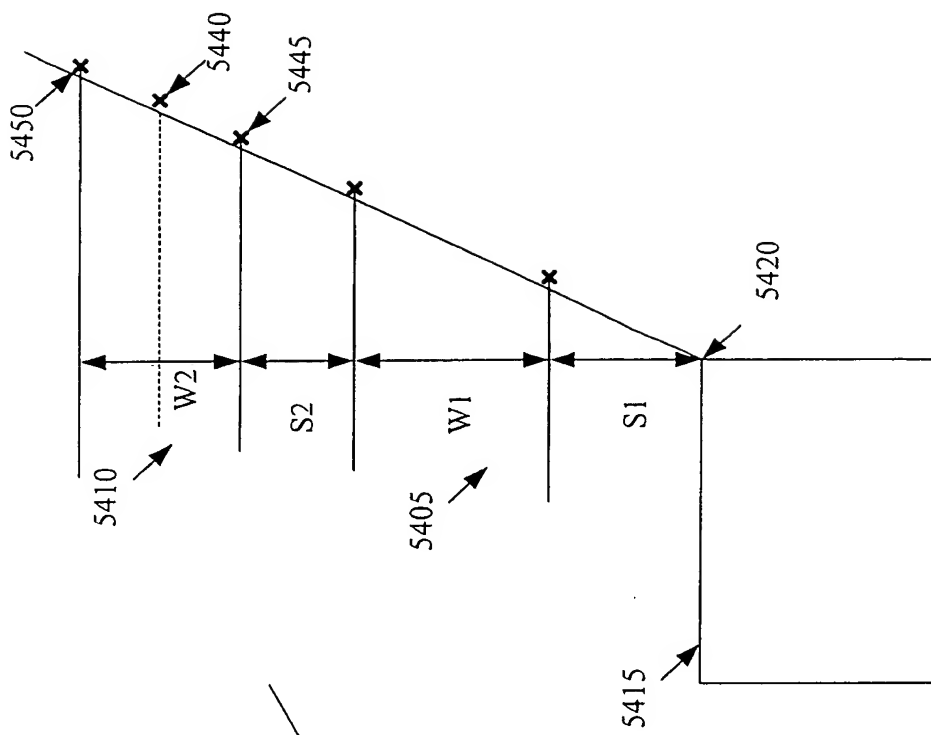


Figure 54

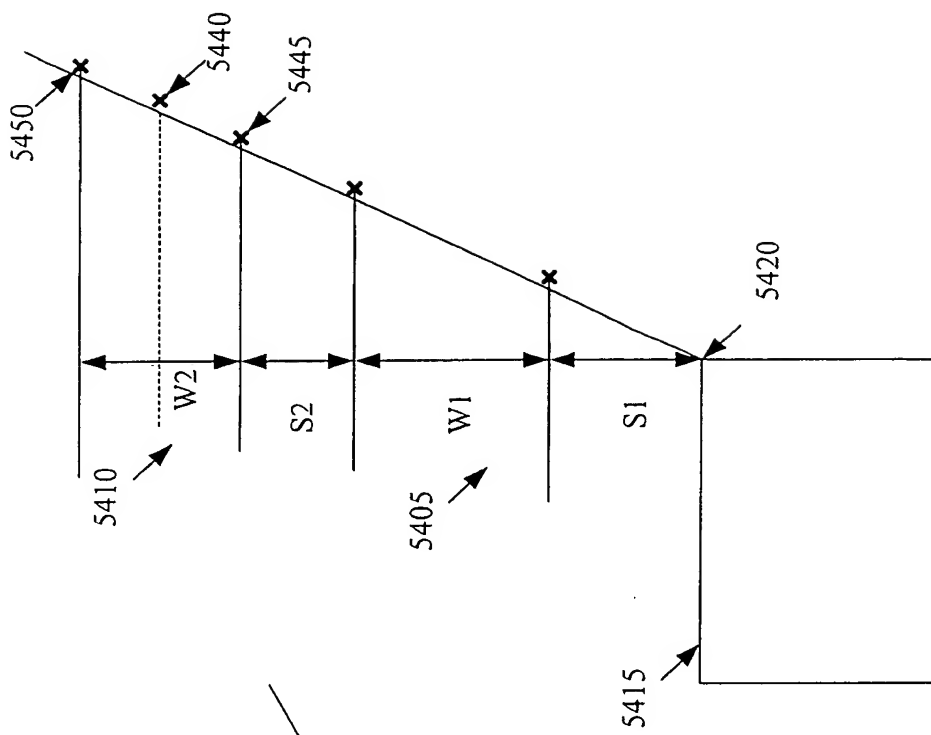
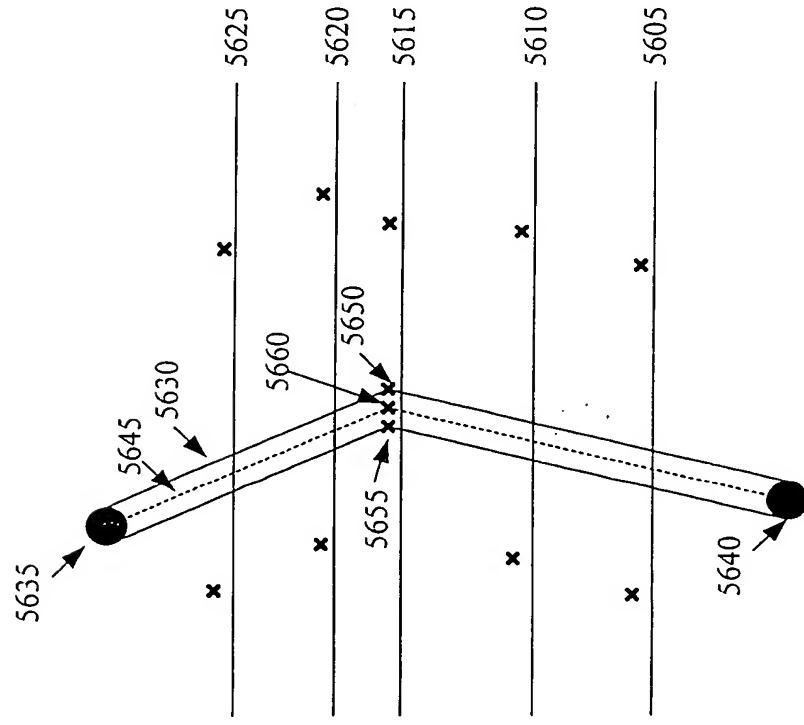
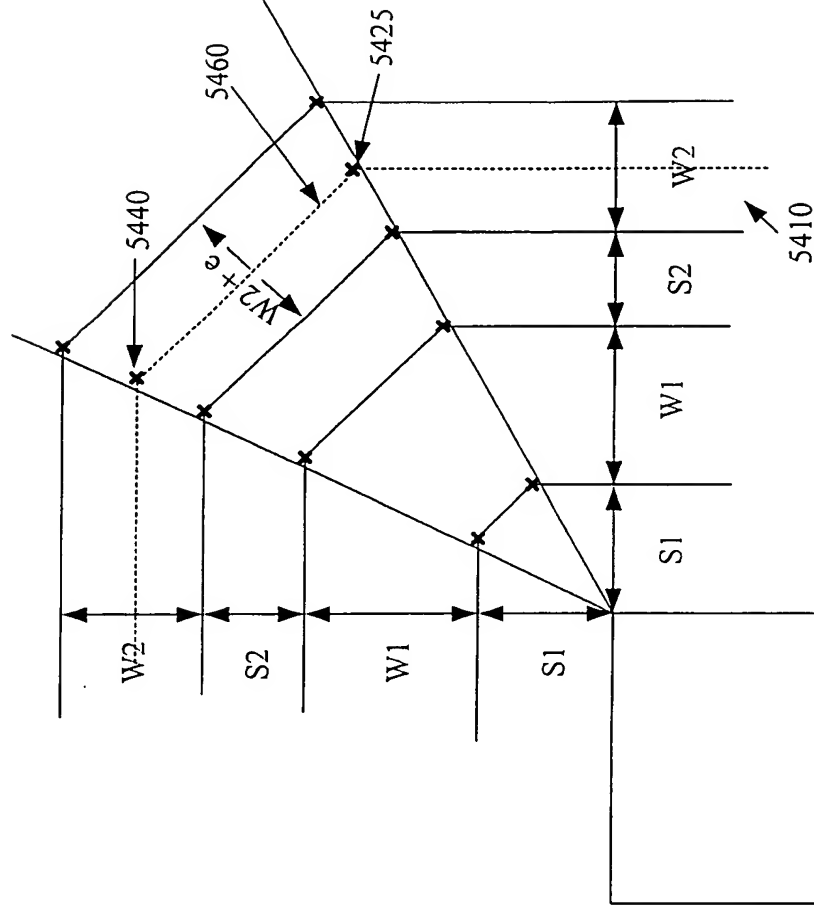


Figure 55



*Figure 56*



*Figure 57*

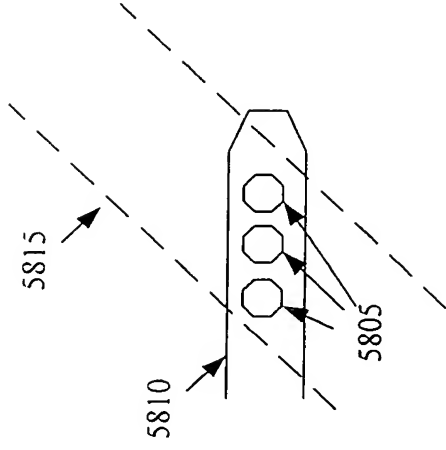


Figure 58

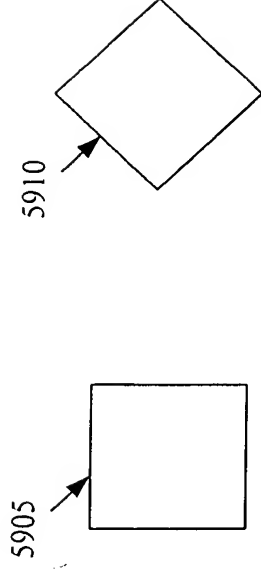


Figure 59

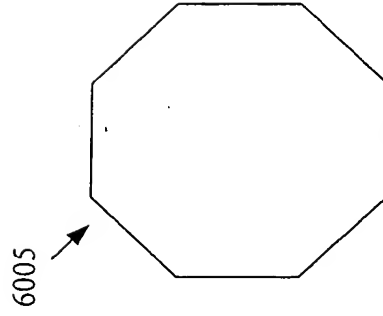


Figure 60

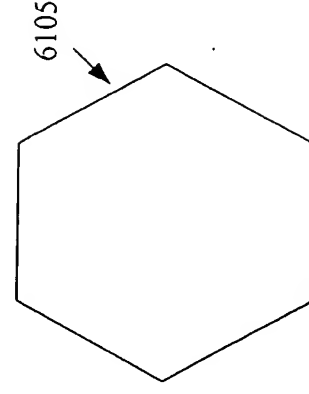


Figure 61

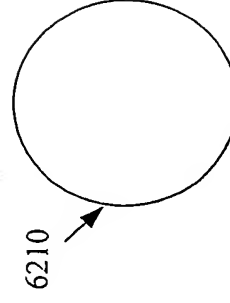


Figure 62

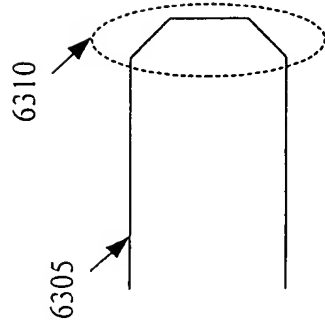


Figure 63

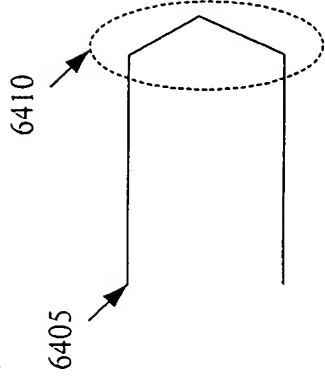


Figure 64

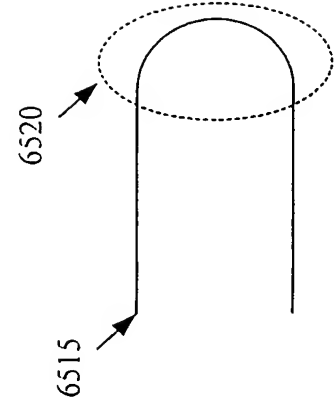
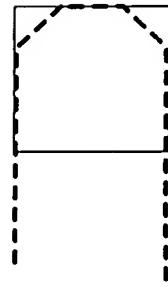
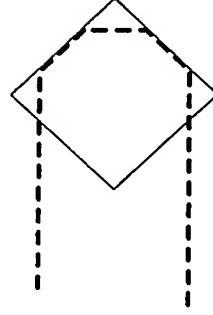


Figure 65

(1)



(2)



(3)

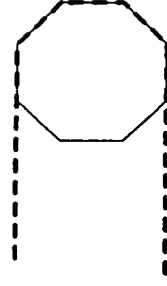


Figure 66



Figure 67

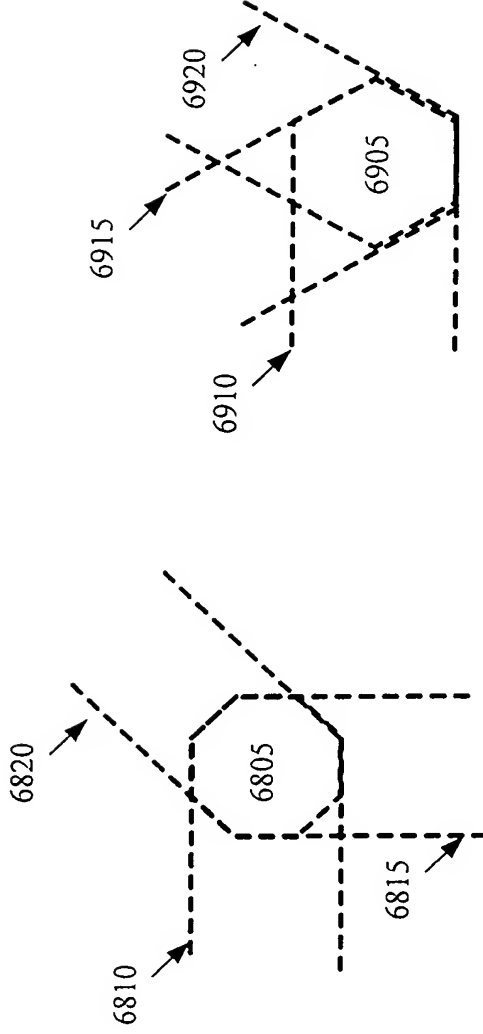


Figure 68

Figure 69

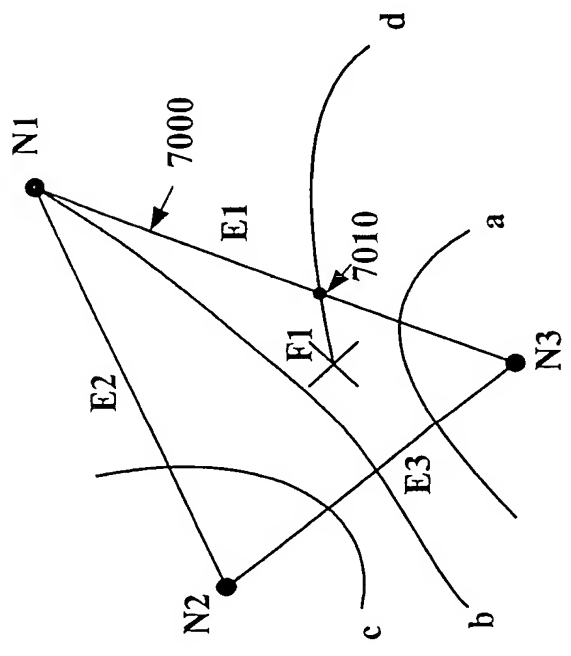


Figure 70

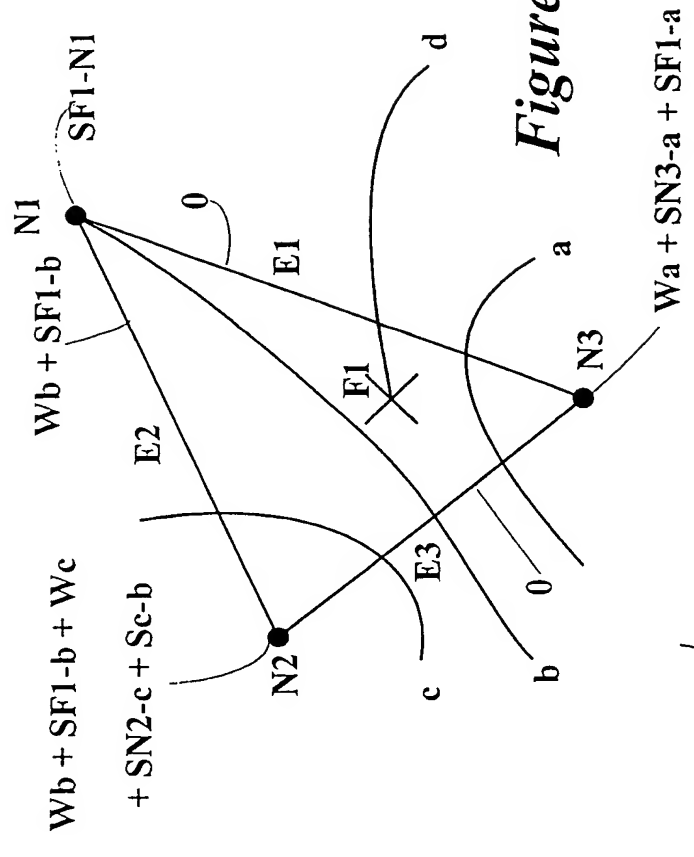


Figure 71

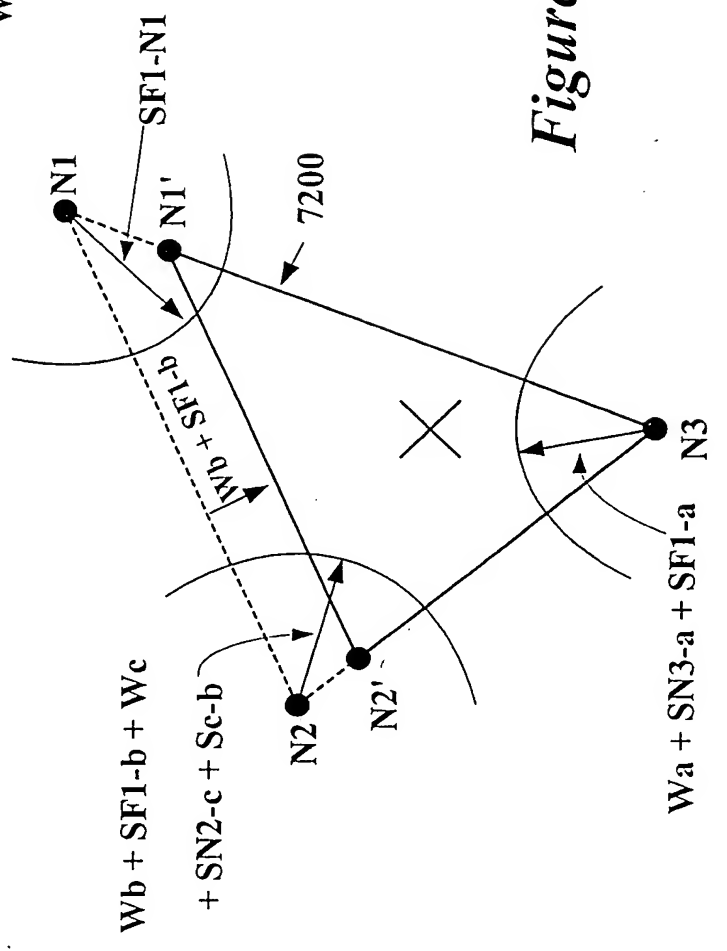


Figure 72

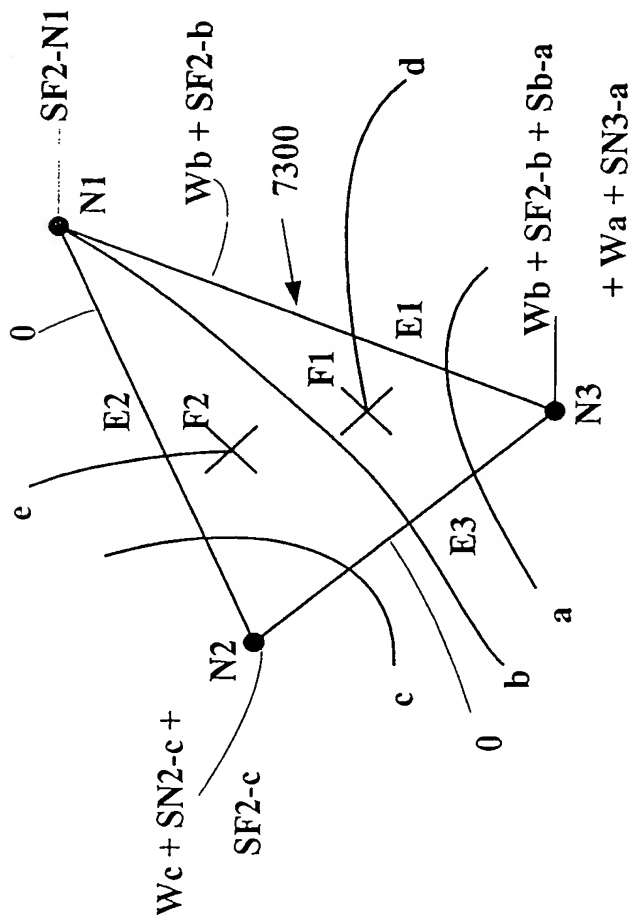


Figure 73

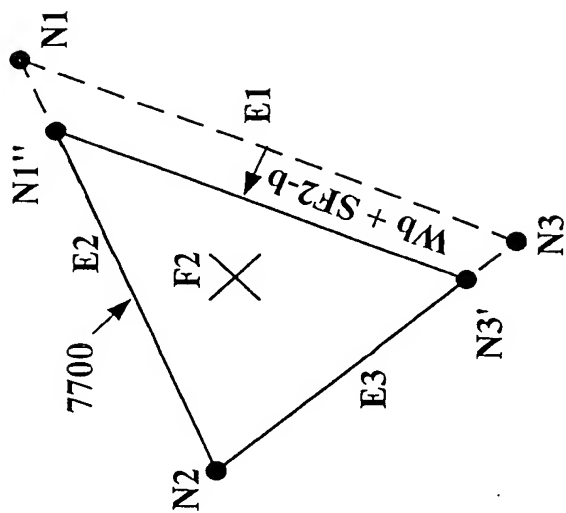


Figure 77

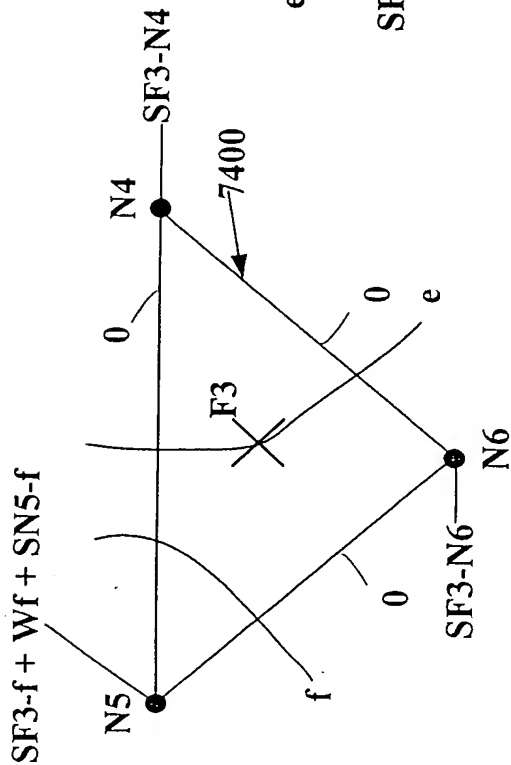


Figure 74

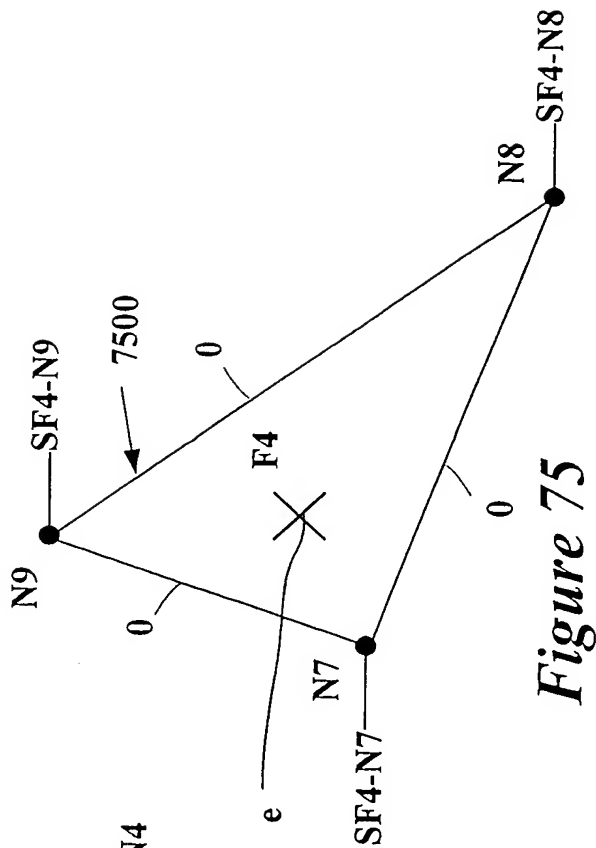


Figure 75

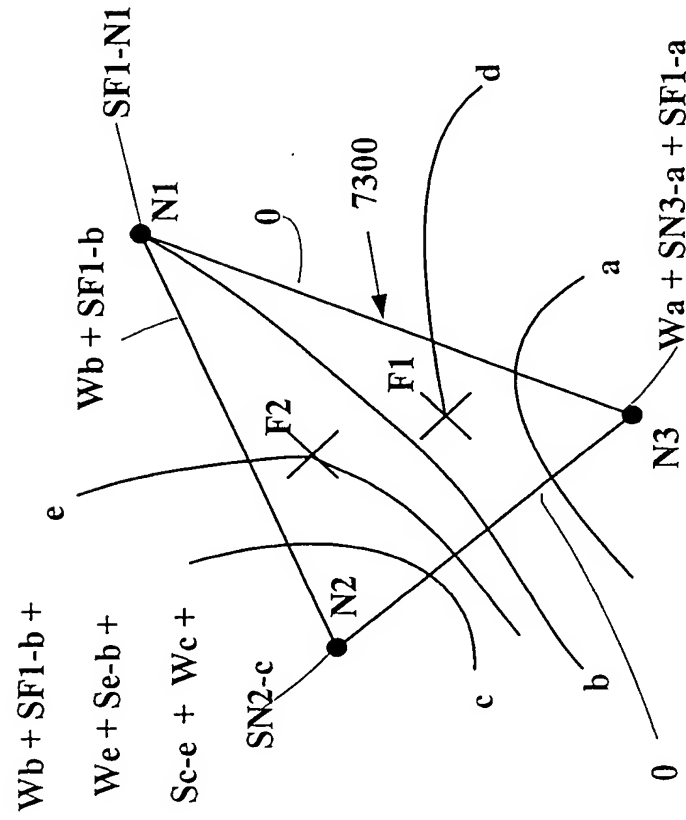


Figure 76

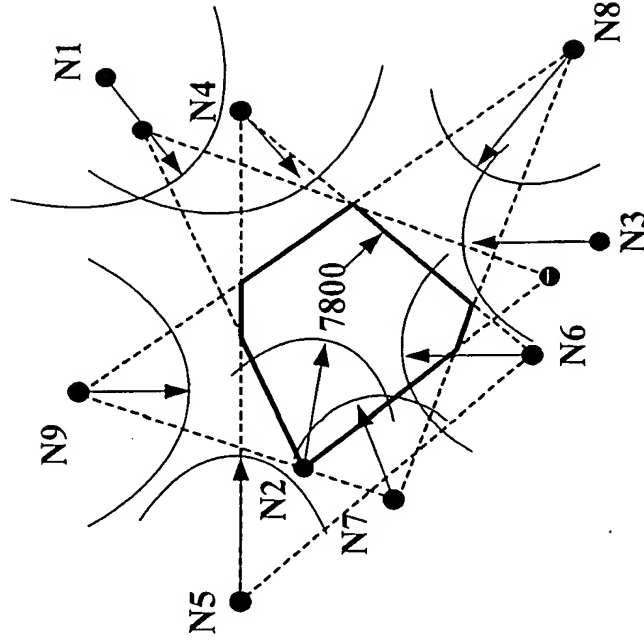


Figure 78



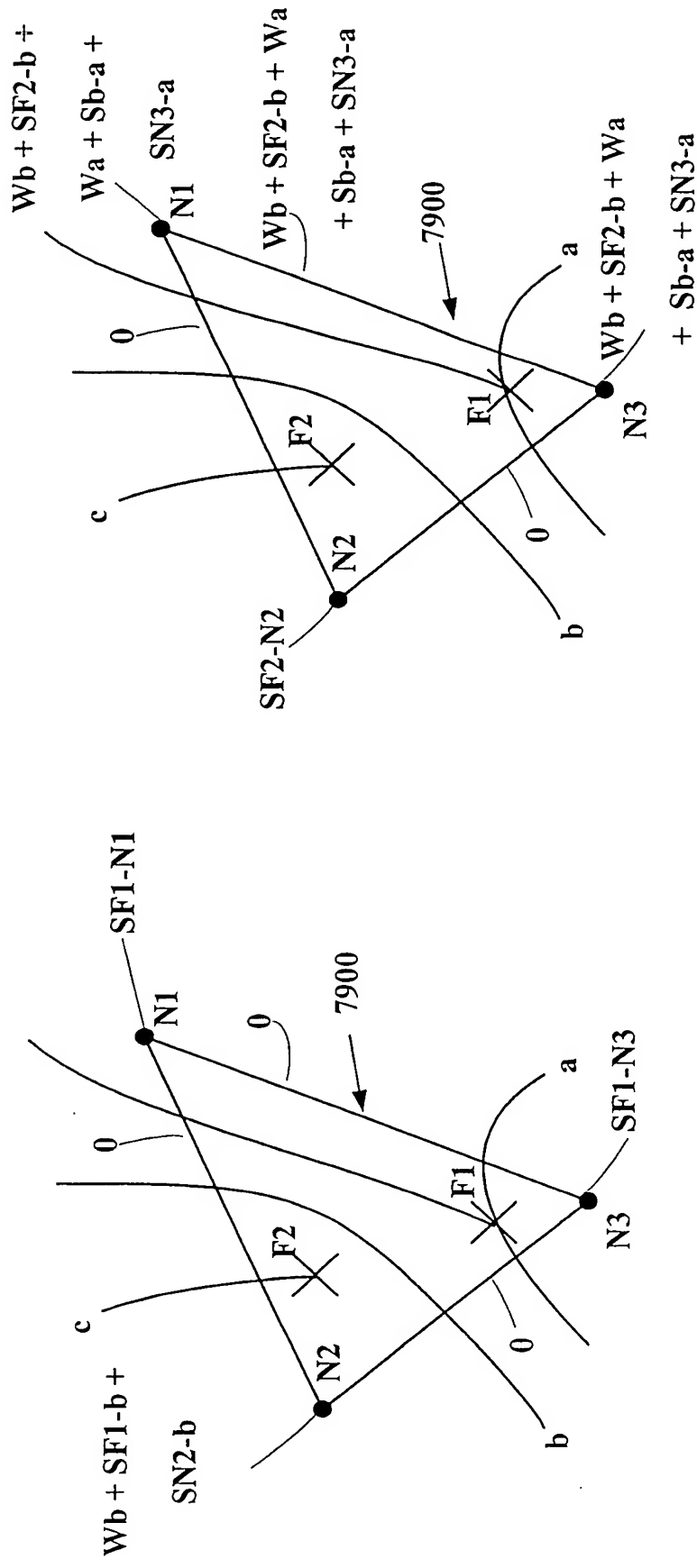


Figure 79

Figure 80

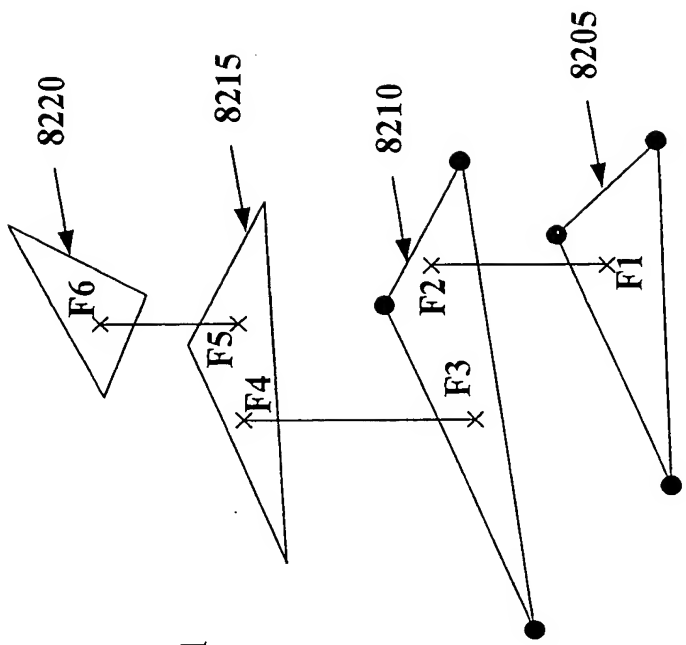


Figure 81

Figure 82

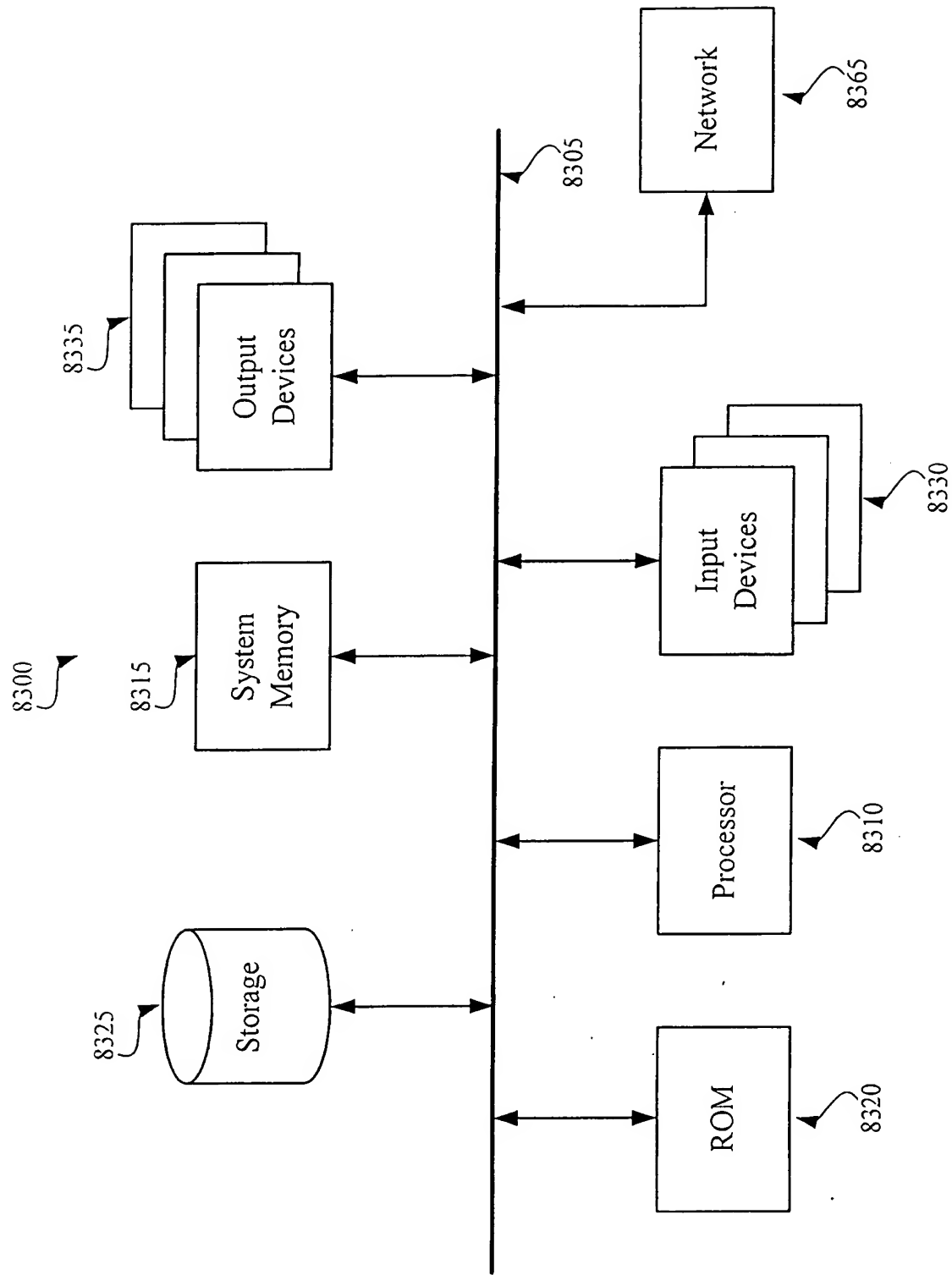


Figure 83